Guidance Material
for ATS
Data Link Services
in NAT Airspace

Chapter 2 - CPDLC

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Change Record

(new) indicates new number or title, without a change in content. "New" indicates new content.

Changes to version 6.0 to produce version 6.1	
Change to Paragraph(s)	**Reason for Change**
Altitude Messages – 5.7 5.7.1 amended. 5.7.2 and 5.7.4 deleted; remaining paragraphs renumbered accordingly.	All altitude clearances will include uplink element REPORT LEVEL [level]; this is a change from previous procedure of including two uplink elements REPORT REACHING [level] and REPORT LEVEL [level].
Changes to version 6.1 to produce version 7.0	
Change to Paragraph(s)	**Reason for Change**
Participation Requirements – 2.6 2.6.8 amended. Responsibilities – Aircraft Operators – 6.2 6.2.5 amended.	The use of HF data link is not yet approved for FANS 1/A ATS messages.
Freetext Messages – 5.6 5.6.2 amended.	Only non-distress freetext messages do not require a response. **DM68**, the distress freetext message element, does require a response.
Altitude Messages – 5.7 5.7.2 amended.	To clarify why REPORT REACHING [level] should not be used to determine an aircraft has leveled at the specified level.
Flight Crew – 7.3 7.3.10 deleted.	Editorial – to remove unneeded direction.
Flight Crew – 7.3 Re-titled Flight Crew – General. Introductory section amended. New Flight Crew – Aeradio Contact – 7.4 added and subsequent sub-parts renumbered. Aeradio – 7.5 (new) New 7.5.2, 7.5.3 and 7.5.4 added.	Flight crews will identify themselves as "CPDLC" upon initial contact with each NAT FIR. Aeradio operators will respond as appropriate, dependent on whether the FIR they serve offers CPDLC services and, if the FIR offers CPDLC services, whether the next frequency required by the flight will be assigned via CPDLC.
AFN Logon – 3.2 3.2.3 - new sub-paragraphs e) and f) added. 3.2.5 and 3.2.6 amended. Flight Crew – General - 7.3 (new) 7.3.1 amended. New 7.3.2 and 7.3.3 added, subsequent paragraphs renumbered and 7.3.4 (new) and 7.3.5 (new) amended. ATC Automation – AFN Logon – 8.1 New 8.1.2 added and subsequent paragraphs renumbered.	There are a number of predictable circumstances that will result in the AFN Logon being rejected. For example, the Shanwick FIR will reject logons unless the oceanic clearance has already been issued. As well, to minimize workload associated with a very limited benefit, Shanwick FIR will reject logons from westbound flights proceeding into, or transiting, the Madrid FIR. Information regarding certain predictable circumstances that will result in the AFN Logon being rejected, in addition to recommended courses of action regarding those circumstances, is now provided.
Flight Crew – General 7.3 (new) New 7.3.12 added and subsequent paragraphs renumbered.	Flight crews must request the domestic frequency assignment from aeradio if it has not been received prior to the flight being 10 minutes from entering domestic airspace.
Emergency Messages During Operational Trials – 7.6 7.6.2 amended. New 7.6.3 added and subsequent paragraphs renumbered.	Some emergency messages will be rejected by the Shanwick ground system during Phase 1 and 2.

(new) indicates new number or title, without a change in content. "New" indicates new content.

Changes to version 6.1 to produce version 7.0 (continued)	
Change to Paragraph(s)	**Reason for Change**
Appendix B – Emergency Downlink Messages Re-titled – Emergency Downlink Message Elements. Table 7 amended.	Appendix B contains a list of message elements, some of which may be sent, along with other message elements, in a single message. DM68 is now added to the list of message elements which should be processed as emergency message elements.
ATC Automation – 8 New sub-part 8.4 added and former sub-part 8.4 renumbered 8.6. Flight Crew – General – 7.3 (new) New 7.3.15 added and former 7.3.13 renumbered 7.3.16. Appendix A – CPDLC Message Sets Table 5 and accompanying notes amended.	Downlink messages containing requests for re-clearance will receive automatic responses which serve, in part, to inform flight crews their requests have been received by the ground system. These responses are dependent on the Operational Trial Phase. Lack of a response or receipt of a different response should alert the flight crew to the possibility of a communications error, requiring clarification via voice contact.
ATC Automation – 8 New sub-part 8.5 added. Managing CPDLC Messages – 5 5.4.3 – cross reference to 8.5 added.	A MRN should only be included with an uplink message when appropriate, dependent on whether the downlink message to which it is responding technically requires a response.
Acronyms – 1.1 CMU added. System Description – 2.3 2.3.3 a) amended.	Messages are delivered to the ACARS MU or to the Communications Management Unit (CMU).
Definition of terms – 1.2 "Open message element" deleted. Example Exchange – 1.3 amended.	The term "open message element" is not correct. Certain message elements require a response, while others do not. A message containing at least one message element that requires a response is an open message.
Example Exchange – 1.3, Appendix C and Appendix D amended.	Editorial - to reflect inclusion of REPORT LEVEL [level] with all altitude clearances.
Numerous	Editorial - where appropriate, the generic term "data link" is replaced by either "CPDLC" or "FANS 1/A data link".
Cautions with the END SERVICE Message – 4.1 4.1.5 amended.	Editorial – for clarity.
Procedures – Flight Planning – 7.1 7.1.2 amended.	Editorial – to remove information not pertinent to flight planning.
Emergency Messages During Operational Trials – 7.6 7.6.4.3 amended.	Editorial correction – to add DM58 to the list of elements that should receive a ROGER response.
Downlink Message Element Attributes – 8.3 Re-titled Emergency Message Element Handling	Editorial – for clarity.

(new) indicates new number or title, without a change in content. “New” indicates new content.

Changes to version 7.0 to produce version 8.0	
Change to Paragraph(s)	**Reason for Change**
Operational Concepts - 2.2 New 2.2.4 added and subsequent paragraph renumbered. Area of Applicability 2.4 2.4.1 and 2.4.2 amended. Conduct of CPDLC Operational Trials - 2.5 Re-titled Conduct of Phased CPDLC Operational Trials New New York CPDLC Implementation - 2.6 added and subsequent sub-parts renumbered. Appendix A - CPDLC Message Sets re-titled CPDLC Message Sets - Phased New Appendix G - CPDLC Message Sets - New York added.	The United States intends to implement CPDLC in a portion of the New York OCA. This implementation will utilize more of the CPDLC functionality and messages sets than in the Gander and Shanwick OCAs. This implementation will not be considered a trail and will not be implemented in a phased manner.
AFN Logon - 3.2 3.2.10 amended.	The correct AFN Logon address for CPDLC service in the New York OCA is KZWY
AFN Logon - 3.2 New 3.2.11 added.	Clarification provided that the appropriate ADS contracts will be set up as a result of AFN Logon to any address specified for CPDLC services in a NAT OCA.
Altitude Messages - 5.7 5.7.1 amended.	REPORT LEVEL [level] will only be appended to altitude clearances where a **single** level is assigned.
Flight Crew - General - 7.3 7.3.4 and 7.3.5 amended.	Clarification provided regarding ATS responsibilities when a flight completes AFN Logon prior to entering the FIR.
Flight Crew - General - 7.3 7.3.7 and 7.3.8 amended. Appendix F - Standard Freetext Messages for Use in NAT CPDLC Trials Airspace Table 14 amended.	ATSUs are to specifically advise flights if they intend to retain a CPDLC connection beyond the boundaries of their FIR. Guidance is provided regarding flight crew responsibilities when entering another FIR while retaining a CPDLC connection with the previous FIR. New Standard Freetext Message 006 is added.
New Appendix H - Reference Guide to NAT Data Link Services added.	Provides a quick reference table to available NAT data link services.
Changes to version 8.0 to produce version 9.0	
7.5.4 b) 3. and Table 5 amended. 5.7.3 and 5.7.4 combined.	Editorial corrections.
Tables 2, 4 and 6 amended.	To include Standard Freetext 006.
Example Exchange - 1.3 amended.	Explanation of downlink message LEVEL FL350 amended to account for differences between FANS A and A+ and FANS 1 avionics.
New York CPDLC Implementation - 2.6 2.6.1, 2.6.3 and 2.6.5 amended. Appendix H - Reference Guide to NAT Data Link Services New York amended.	CPDLC and ADS services are now available in a portion of the New York OCA, now referred to as the New York Data Link services area.
Participation Requirements - 2.7 2.7.2 amended.	Information already contained in 2.7.3 and 2.7.6 is removed from 2.7.2..

Changes to version 8.0 to produce version 9.0, continued	
Change to Paragraph(s)	**Reason for Change**
Cautions with the END SERVICE Message - 4.1 4.1.2 amended. Procedures - Flight Crew - General - 7.3 7.3.13 amended.	There are differences between FANS A and A+ and FANS 1 avionics as regards the effect of sending the END SERVICE message when there are uplink messages open.
Altitude Messages - 5.7 New 5.7.4 added. Appendix A, table 6 amended Appendix F, table 14 amended	When a flight requests an altitude change, ATC may not be able to approve the requested level, but may be able to approve an intermediate level. This paragraph describes how such a transaction will be handled. The procedure involves including new standard freetext message 007.
Managing CPDLC Messages - 5 New 5.8 Route Messages added.	ARINC specification 424 should not be used for the transmission of geographic coordinates when using data link for ATS purposes.
Flight Crew - Contact with Aeradio - 7.4 7.4.2 and 7.4.3 amended.	Amended to advise pilots not to include a position report with the initial contact.
Flight Crew - Contact with Aeradio - 7.4 7.4.6 amended. Appendix E - Voice Phraseology CPDLC FAILURE - note added.	If a transmission to a particular flight or station is being made via voice rather than CPDLC due to a CPDLC failure, the phraseology is included to alert the other party to the failure. The phraseology should be included with the first such transmission only.
Change to version 9.0 to produce version 9.1	
Change to Paragraph	**Reason for Change**
Flight Crew - Contact with Aeradio - 7.4 7.4.2 a) corrected	A position report should not be included with the initial contact.

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1 Explanatory Notes

1.1 Acronyms

ACARS	Aircraft Communications Addressing and Reporting System
ADS	Automatic Dependent Surveillance
ADS WPR	Automatic Dependent Surveillance Waypoint Position Reporting
AFN	ATS Facilities Notification
ATC	Air Traffic Control
ATM	Air Traffic Management
ATS	Air Traffic Services
ATSU	Air Traffic Services Unit
CDA	Current Data Authority
CMU	Communications Management Unit
CNS	Communications, Navigation and Surveillance
CNS/ATM	Communications, Navigation and Surveillance Air Traffic Management
CPDLC	Controller Pilot Data link Communications
CTA	Control Area
DM	Downlink Message
DSP	Data link Service Provider
FANS	Future Air Navigation System
FANS 1	Boeing implementation of FANS
FANS A	Airbus implementation of FANS
FANS 1/A	Boeing & Airbus implementations of FANS
FCMA	FANS Central Monitoring Agency
FDPS	Flight Data Processing System
FFE	FANS Front End
FIG	FANS Implementation Group
FIR	Flight Information Region
FL	Flight Level
FMC	Flight Management Computer
HF	High Frequency
ICAO	International Civil Aviation Organization
MAS	Message Assurance

MIN	Message Identification Number
MRN	Message Reference Number
MU	(ACARS) Management Unit
NAT	North Atlantic
NDA	Next Data Authority
OCA	Oceanic Control Area
ORD	Operational Requirements Document
OTS	Organized Track Structure
PANS-ATM	Procedures for Air Navigation Services – Air Traffic Management (ICAO Document 4444)
SITA	Société Internationale de Télécommunications Aéronautiques
UM	Uplink Message
WPR	Waypoint Position Reporting

1.2 Definition of terms

An example exchange between a flight and the ground is included after this section, to further illustrate the meaning of these terms.

Message element – a portion of a message. Each message element is assigned a particular set of attributes that determine:
a) its priority;
b) whether it will close other message elements;
c) which other message elements are suitable responses; and
d) whether it requires a closure response and, if so, which other message elements are able to close it.

Defined message element – a message element whose content and format are pre-determined. A defined message element may require specified information to be inserted, but the rest of the content is not variable. Because of this, defined message elements make automatic processing possible.

Freetext message element (usually referred to as a freetext message)– a message element whose content is variable, i.e. composed by the sender. ATS providers may construct a set of standard freetext messages to relieve controllers of the burden of repeatedly composing commonly used messages. Such a set should include an explanation as to the intended meaning of each message.

Message – an individual uplink or downlink CPDLC communication, made up of one or more message elements (maximum of five).

Downlink message – a CPDLC message sent from an aircraft.

Uplink message – a CPDLC message sent from a ground system.

Standard Freetext message – a freetext message that is "pre-composed".

Open message – a message that contains at least one message element that requires a response. An open message remains open until the required response is received.

Closure response – a message containing a message element that has the ability to close another message.

Message closure – Providing the closure response. Irrespective of the number of elements that require a response contained in an open message, each open message will be closed by a single message element, determined by the particular mix of attributes assigned to the elements contained in the open message.

Closed message – a message that:
a) contains no message elements that require a response; or
b) has received a closure response.

CPDLC dialogue –
a) a single message that is a closed message; or
b) a series of messages beginning with an open message, consisting of any messages related to the original open message and each other through the use of Message Reference Numbers (MRNs) and ending when all of these messages are closed.

1.3 Example Exchange

This example exchange serves to further illustrate the meaning of some CPDLC terms and related concepts. The conventions for referring to specified uplink or downlink message elements are explained in section 1.4. Message Identification Numbers (MINs) and Message Reference Numbers (MRNs) are further explained in sections 5.3 and 5.4.

Downlink: Request FL350 MIN = 8	This message consists of one defined message element, **DM6**, into which the requested altitude has been inserted. This message element requires a response. Because of this, the message is open. Because of that, this CPDLC dialogue is still open.
Uplink: STANDBY MRN = 8 MIN = 12	This message consists of one defined message element, **UM1**. This element does not require a response The MRN links this response to the request. Because STANDBY will not close a message, the downlink message is still open. Because there is an open message, this dialogue is still open.
Uplink: CLIMB TO AND MAINTAIN FL350. REPORT LEVEL FL350. MRN = 8 MIN = 13	This message consists of two defined message elements, **UM20** and **UM129**, into which a specified level has been inserted. This message closes the associated downlink message (MIN = 8). This message contains two message elements that require a response. Therefore, it is an open message. The response that will close this message is the WILCO or UNABLE response to the clearance message element. Because there is an open message, this dialogue is still open.
WILCO MRN = 13 MIN = 9	This message consists of one defined message element, **DM0**. This message element does not require a response. Therefore, this is a closed message. This element closes the associated uplink message (MIN = 13). Because all messages are now closed, this dialogue is now closed.
Downlink: LEVEL FL350 MIN = 11	This message consists of one defined message element, **DM37**, into which the altitude was inserted by the aircraft system. In FANS 1 aircraft, the altitude in the report is taken from the altitude specified in the uplink message element (**UM129**) and cannot be changed by the pilot. In FANS A or FANS A+ aircraft, the altitude in the report can be changed by the pilot. Downlink reports do not contain MRNs. This message element does not require a response. Therefore, this is a closed message. Because there are no open messages, this dialogue is now closed.

1.4 Editorial Conventions

1.4.1 When referring to a specific downlink message element, the format will be **DMnumber**, where:

a) **DM** stands for downlink message; and

b) **number** is the number assigned to that specific message element as per the FANS 1/A message sets detailed in Data Link Initiatives for the North Atlantic (NAT) Region, Part 4, Appendix E.

For example: **DM10**

1.4.2 When referring to a specific uplink message element, the format will be **UMnumber**, where:

a) **UM** stands for uplink message; and

b) **number** as per 1.3.1 b) above.

For example: **UM167**

1.4.3 The body of the message will be indicated by TEXT IN UPPERCASE.

1.4.4 (freetext) precedes message elements that are not pre-formatted. Freetext message elements may be standard or adhoc.

1.4.5 [ ] enclose a description of information to be inserted into a message.

1.4.6 { } enclose explanatory notes from the editor. If the explanatory note occurs within a CPDLC message, it will be further distinguished from the actual body of the message by being italicized.

1.5 Reference Documents

Inter alia, the following documents were used as reference material:

Guidance Material for ATS Data link Services in NAT Airspace, version 4.0

PANS-ATM (ICAO Doc 4444), PART XI

Data Link Initiatives for the North Atlantic (NAT) Region

Annex 10, Volume II, Chapter 8

ED-X5/DO-XX5 Interoperability requirements for ATS applications using ARINC 622 data communications

2 Introduction

2.1 Background/Requirement

2.1.1 The implementation plan for data link technologies for the North Atlantic is outlined in the NAT document "Data Link Initiatives for the North Atlantic (NAT) Region". According to the agreement reached by States at FIG/2, the implementation of CPDLC will follow a phased approach in Gander and Shanwick Oceanic Control Areas (OCAs). These phases are detailed in section 2.5.

2.1.2 Support for the use of CPDLC in the NAT Region is based on:

a) an awareness of FANS 1/A deployment in aircraft fleets;

b) the need to gain operational and technical experience with CPDLC;

c) the need to help alleviate concerns of the possibility of deterioration or shortfall of HF communications performance in the NAT;

d) the expectation of reduced pilot and controller workload; and

e) the expectation of reduced communication errors.

2.1.3 Users have identified a desire to increase the applications supported by FANS 1/A equipage already existing and planned for their fleets.

2.2 Operational Concepts

2.2.1 A mixed aircraft equipage environment will continue to exist for many years. Mandatory FANS 1/A aircraft equipage is currently not envisaged for the NAT Region.

2.2.2 Initial Air Traffic Services (ATS) trial use of FANS 1/A data link in NAT airspace consisted of Automatic Dependant Surveillance Waypoint Position Reporting (ADS WPR). Its performance and usefulness have been confirmed and it is currently in the Operational Trials phase in the majority of NAT OCA/FIRs.

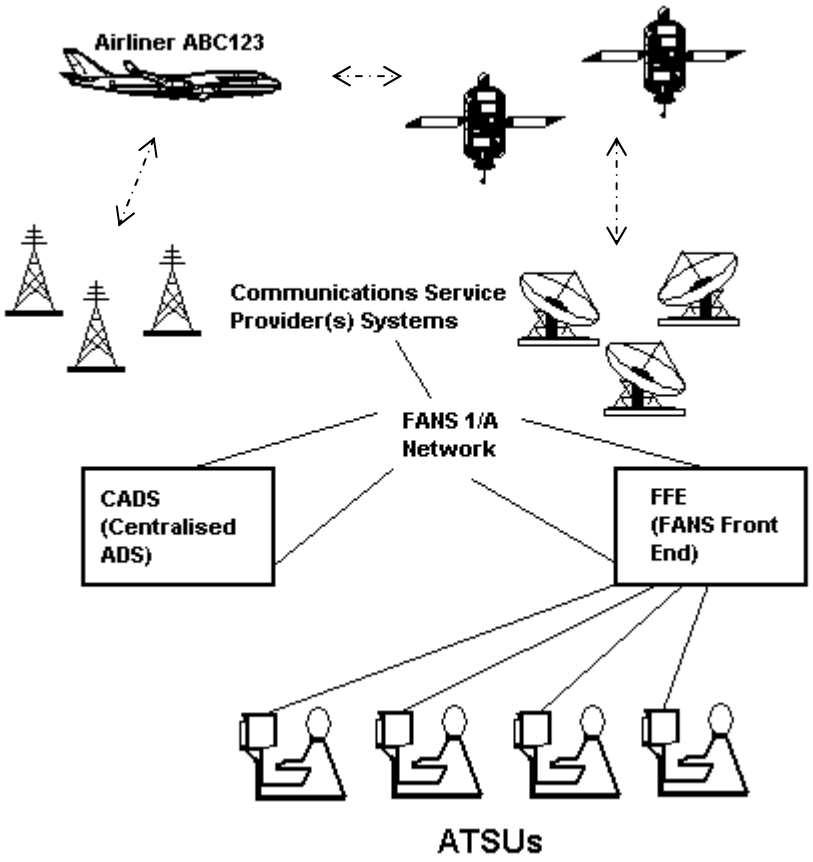
2.2.3 Initial Operational Trials using CPDLC (Phases 1 and 2) will involve only non-critical messages and utilize strictly limited message sets. Phase 3 will also use a limited message set but may be amended based upon user and controller input from the initial Phases. It is intended that Phase 3 will allow pilot requested altitude and speed changes to be handled via CPDLC. These phases are described in further detail in section 2.5.

2.2.4 CPDLC implementation in the New York OCA will not be considered a trial, as it is an operational implementation of a system already in use by the FAA in other airspace.

2.2.5 The backup system for CPDLC is voice radio.

2.3 System Description

2.3.1 ADS and CPDLC communications will be provided through the FANS 1/A network. This network provided by Data link Service Providers (DSPs), carries FANS 1/A communications between aircraft and ATS Units (ATSUs). An interface to the FANS 1/A network may be provided by a FANS Front End (FFE) process. Provider states may choose to build Gateway functionality into their own Flight Data Processing Systems (FDPSs).



2.3.2 ATS Facilities Notification (AFN) Logons received from aircraft provide each ATSU with the information required to correctly route CPDLC messages between themselves and that aircraft.

2.3.3 The FANS 1/A system does not provide for end-to-end message assurance. Therefore, there can be no guarantee provided by the ground system or the avionics that the message has been delivered to the controller or flight crew. However:

a) the ATS system will receive a network acknowledgment (MAS Message Assurance) to an uplink message indicating that the message has been delivered to the aircraft's ACARS MU or the Communications Management Unit (CMU);

b) the avionics will receive a system acknowledgment to a downlink message indicating that the message has been delivered to the DSP's system; and

c) the crew is advised when system acknowledgement from the DSP is received.

2.3.4 More detailed information regarding connection management (AFN Logon and CPDLC connections) is provided in Part 3 - Managing CPDLC Connections.

2.4 Area of Applicability

2.4.1 This document applies to CPDLC trials and operational implementations being carried out in the following airspace (hereinafter referred to as CPDLC trials airspace):

a) The Gander OCA

b) The Shanwick OCA
(implementation may not be concurrent with Gander OCA)

c) The portion of the New York OCA described in 2.6.1
(implementation not concurrent with Gander/Shanwick OCAs)

2.4.2 The phased approach detailed in section 2.5 is planned for the Gander and Shanwick OCAs only. A non-phased, fully operational implementation of CPDLC services, as further described in 2.6 was commenced in portions of the New York OCA in March, 2003.

2.4.3 The CPDLC Operational Trial Plans of other NAT Provider States have not yet been finalized.

2.5 Conduct of Phased CPDLC Operational Trials

2.5.1 Phase 1 – Basic Request Phase

2.5.1.1 This initial phase will enable an aircraft to make various speed and altitude requests using CPDLC.

2.5.1.2 The response from the ground system will be a freetext acknowledgement that the request had been received and that a response from ATC will be provided by aeradio via voice. These messages can be found in Appendix F.

2.5.1.3 The defined downlink and uplink message sets supported for Phase 1 can be found in Appendix A, Table 1 and Table 2. Example CPDLC dialogues are illustrated in Appendix C.

2.5.2 Phase 2 – Advising Domestic Frequencies

2.5.2.1 This phase introduces the assignment of domestic contact frequencies via CPDLC. Analysis of HF voice traffic indicates that such messages represent a significant proportion of existing voice traffic and using CPDLC to carry out this function would be a useful contribution to reducing HF voice congestion.

2.5.2.2 The defined downlink and uplink message sets supported for Phase 2 can be found in Appendix A, Table 3 and Table 4. Example CPDLC dialogues are illustrated in Appendix C.

2.5.2.3 It is considered that these functions offer opportunities for aircrew and controllers to gain experience in using CPDLC by carrying out routine, non-critical functions, with voice remaining available as a backup system. Feedback from users and operational personnel will be considered in amending this Guidance Document and developing and/or amending NAT CPDLC procedures.

2.5.2.4 It should be noted that Phases 1 & 2 could be implemented simultaneously.

2.5.3 Phase 3 – Support Enroute Altitude Changes and Speed Changes

2.5.3.1 This phase will enable aircraft to request En Route altitude changes, En Route speed changes and to report Leaving/Reaching Levels via CPDLC.

2.5.3.2 Responses to these requests from ATSUs will also be via CPDLC.

2.5.3.3 This phase is subject to amendment, based upon FCMA reports and input from users and controllers.

2.5.3.4 The defined downlink and uplink CPDLC message sets supported for phase 3 can be found in Appendix A, Table 5 and Table 6. Example CPDLC dialogues are illustrated in Appendix C.

2.5.4 It is anticipated that future operational trial phases will utilize increasing numbers of the FANS 1/A message sets. Where operationally suitable, efforts will be made to harmonize NAT CPDLC procedures with those in use in other Regions.

2.6 New York CPDLC Implementation

2.6.1 The approach described in this section is applicable to the implementation of CPDLC services in that portion of the New York OCA comprising MNPS airspace (except A700) and that airspace south of 27º North and east of 60º West, inclusive (hereinafter referred to as the New York Data Link service area).

2.6.2 CPDLC service will utilize the message sets contained in Appendix B, Appendix F and Appendix G. Operators should note that other NAT areas do not support all of the message elements contained in Appendix G (see 2.5 for information related to phased CPDLC operational trials).

2.6.3 In the New York Data Link service area (see 2.6.1), first preference for position reports is ADS WPR, followed by CPDLC (ensuring that geographic coordinates are not encoded as per ARINC specification 424), followed by HF voice. Operators should note that voice reports are required unless otherwise advised.

2.6.4 Unless otherwise advised, additional AFN Logon to initiate ADS services with other NAT OCAs is not required, once an Active CPDLC connection is established with KZWY.

2.6.5 Flights entering the New York Data Link service area (see 2.6.1) should be especially aware of the guidance at 7.3.7 because automatic CPDLC transfers from other FIRs to KZWY may not be enabled during the initial New York CPDLC implementation.

2.7 Participation Requirements

2.7.1 In order to participate in the Trials, and subsequent operations, Operators must be in possession of the appropriate approval(s) issued by the State of Registry or the State of the Operator.

2.7.2 It is the responsibility of the Operator to ensure that only trained crews avail themselves of CPDLC services. To facilitate this, a separate logon address (CADS) will be available as an alternative for those crews that should only use the ADS WPR portion of the FANS 1/A avionics.

2.7.3 Operators must indicate their intention to participate in the trials by contacting the FCMA and providing the following information:

a) Operator name;

b) Operator contact person;

c) aircraft type(s) and associated registration(s);

d) assurance that operational approval has been obtained in accordance with FAA AC 120-70 and the associated Operational Approval Information Package, or, if it exists, equivalent material;

e) whether the option of updating the FMC time using the GPS time has been installed for the particular aircraft involved; and

f) anticipated start date of participation.

2.7.4 If Operators have already registered part of their fleet with the FCMA for other purposes, they need only provide the information in items 2.7.3 c) d) e) and f) to indicate their intention to participate in CPDLC.

2.7.5 Operators are requested to advise the FCMA of any changes to 2.7.3 a) or b).

2.7.6 The FCMA will forward information obtained through 2.7.3 or 2.7.4 to participating ATS and Radio Communication providers.

2.7.7 To avoid logons' being rejected and to ensure FANS 1/A downlinks are properly routed, each participating airline must co-ordinate with its Data link Service Provider (or providers if applicable) to initiate FANS 1/A ground system configuration, applicable to the NAT Region, for its aircraft. Please note that this configuration process is applicable to all current FANS 1/A applications, and need not be repeated to participate in CPDLC operations if the aircraft has already been configured to participate in ADS operations in the NAT Region.

2.7.8 The use of HF data link for FANS 1/A ATS messages is not approved at this time.

2.8 Contacts

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3 Managing CPDLC Connections

3.1 Sequence of Events

This section provides a basic outline of the "life cycle" of CPDLC connections. More detailed information about these steps can be found in the rest of Section 3.

3.1.1 AFN Logon

a) When the flight crew completes the procedure to logon, the aircraft system sends an AFN CONTACT message to a specified ATSU

b) The ATSU responds with an AFN ACKNOWLEDGEMENT message

c) AFN Logon is complete

3.1.2 Establishing the first CPDLC connection

a) The specified ATSU [see 3.1.1 a)] sends a CONNECTION REQUEST message to the aircraft

b) The aircraft responds automatically with a CONNECTION CONFIRM message

c) The first CPDLC connection is established; this ATSU is the Current Data Authority (or the Active Centre); this connection is an Active connection

d) CPDLC messages may now be exchanged between the aircraft and the Current Data Authority (CDA).

3.1.3 The Next Data Authority

a) The CDA informs the avionics of the Next Data Authority (Next Centre) by sending the NDA message.

b) The CDA also sends an AFN CONTACT ADVISORY message to the aircraft, providing the avionics with the information required for AFN Logon for the purposes of establishing a CPDLC connection with the Next Data Authority (NDA).

c) The aircraft system responds to the CDA with an AFN RESPONSE message, then sends an AFN CONTACT message to the NDA.

d) The NDA responds to the aircraft system with an AFN ACKNOWLEDGEMENT message.

e) The aircraft system sends an AFN COMPLETE message to the CDA; this advises the CDA that the AFN Logon to the NDA has been satisfactorily completed.

3.1.4 Establishing a second CPDLC connection

a) The NDA sends a CONNECTION REQUEST message to the aircraft

b) The aircraft responds with a CONNECTION CONFIRM message

c) At this point there are two CPDLC connections established: the Active CPDLC connection with the CDA and the Inactive CPDLC connection with the NDA

d) CPDLC messages can only be exchanged with the CDA

3.1.5 Terminating the active CPDLC Connection

a) At the appropriate time, the CDA sends the END SERVICE message to the aircraft to initiate termination of its Active CPDLC connection

b) The aircraft responds with a DISCONNECT message, immediately terminating the Active CPDLC connection

c) The Inactive CPDLC connection becomes Active; the ATSU which was the NDA becomes the CDA

d) The ATSU that has just become the CDA may now exchange CPDLC messages with the aircraft. The previous CDA can no longer exchange CPDLC messages with the aircraft.

e) If no NDA was nominated, the aircraft will no longer have CPDLC connectivity. The previous CDA can no longer exchange CPDLC messages with the aircraft. The first ATSU to send a CONNECT REQUEST message to the aircraft will become the CDA, as long as an AFN Logon has been completed with that ATSU.

3.2 AFN Logon

3.2.1 An AFN Logon to a specific ATSU must be completed before a CPDLC connection or ADS contract can be established. The AFN Logon provides the ATSU's ground system with the aircraft information required to support FANS 1/A data link applications and to positively identify the aircraft from a communications standpoint within the system.

3.2.2 The AFN Logon associates the aircraft's call sign with its registration. The registration is used by the FANS network as the destination address for CPDLC messages to aircraft. ATS personnel usually use aircraft call signs to identify flights. The AFN Logon allows this practice to continue, since the ground system will uniquely identify the pairing of call sign (used by ATS personnel) and aircraft registration (required by the network).

3.2.3 The AFN Logon will be rejected if:

a) the aircraft registration/call sign pairing does not match the pairing contained in the flight plan; (see also 3.3.3)

b) there is no aircraft registration included in the flight plan;

c) there is no flight plan in the ATS system for that flight;

d) the specified ATSU has implemented a process to allow CPDLC connections only with approved Operators and the subject flight is not approved;

e) the flight is entering the Shanwick FIR and the oceanic clearance has not yet been issued to the flight; or

f) the flight will proceed westbound from the Shanwick FIR into or to transit the Madrid FIR.

3.2.4 Various FIRs in the NAT provide different FANS 1/A data link services. Some FIRs offer ADS only, while others will offer CPDLC plus ADS. Aircraft may pass through FIRs that offer only ADS services prior to, and/or between, entering FIRs that offer CPDLC and ADS services. NAT Provider States are in the process of developing procedures to ensure that CPDLC connections are initiated and utilized only as appropriate for aircraft under their control.

3.2.5 The flight crew initiates the first AFN Logon. After completing the logon procedure, the aircraft system will send an AFN CONTACT message to a specified ATSU. The ground system will automatically acknowledge this message, completing the transaction. AFN Logon should take place approximately 15 to 45 minutes prior to entering the first FIR that offers ADS and/or CPDLC services except as specified in 3.2.3 e) and f) above.

3.2.6 If the first AFN Logon specifies an ATSU that does not offer CPDLC services, the flight crew will be required to manually initiate another AFN Logon in order to enable a CPDLC connection with the ATSU responsible for the first FIR along the route of flight that offers CPDLC services. This subsequent Logon should be initiated 15 to 45 minutes prior to entering the first CPDLC FIR except as specified in 3.2.3 e) and f) above.

3.2.7 If the first AFN Logon specifies an ATSU that offers CPDLC services, CADS and other ADS processes will detect the Logon and set up the appropriate ADS contract(s) for the flight, without action by the flight crew.

3.2.8 Once the AFN Logon(s) is/are completed, ground systems will transfer and manage the various connections required for FANS 1/A data link services as the aircraft traverses the OCAs/FIRs served by the various ATSUs. These transfers are initiated and completed automatically, without action by the flight crew.

3.2.9 In the event of an abnormal disconnect from the FANS 1/A network, another manually initiated AFN Logon will be required in order to resume FANS 1/A data link operations.

3.2.10 The AFN Logon addresses for NAT Oceanic Centres/FIRs are:

Gander ACC *	CZQX
Shanwick ACC	EGGX
New York ARTCC	KZWY
	CADS – to participate in ADS WPR only

* The Gander CTA encompasses the Gander Oceanic FIR and that part of the Sondrestrom FIR south of 63°30' North and above FL195. The AFN address CZQX covers the entire Gander CTA.

3.2.11 AFN Logon to any of the addresses in 3.2.10 will result in the appropriate ADS contracts being set up for all NAT Providers offering ADS services. The appropriate AFN Logon address for flights wishing to participate in ADS WPR only is CADS.

3.3 Establishing a CPDLC Connection

3.3.1 In order to establish a CPDLC connection, the following aircraft information is required:

a) aircraft identification/call-sign/flight ID, as shown in the ATC Flight Plan;

b) registration, as shown in the ATC Flight Plan; and

c) CPDLC application availability and version number.

3.3.2 This information is included in the AFN CONTACT message from the aircraft. The ATSU's system must cross-check aircraft identification/call-sign/flight ID and registration against the information contained in the ATC flight plan.

3.3.3 Hyphens contained in an aircraft registration must not be entered into the ICAO flight plan form. Ground systems should, however, be configured so as to prevent the AFN Logon being rejected due to hyphens being included in the aircraft registration sent in the AFN CONTACT message, but not in the flight plan.

3.3.4 Each CPDLC connection is initiated by an ATSU sending the CONNECTION REQUEST message and is established when the CONNECTION CONFIRM message is received from the aircraft.

3.3.4.1 If there is no existing connection, and an AFN Logon to the ATSU has been completed, the avionics will accept this connection as the Active connection. The ATSU with the Active CPDLC connection is the CDA.

3.3.4.2 If there is an existing connection, the avionics will check that the initiating ATSU has been established as the NDA. If so, the avionics will accept this connection as the Inactive connection.

3.3.4.3 In all other situations, the avionics will reject the connection request.

3.3.5 A CPDLC connection established between an aircraft and an ATSU is either Active or Inactive.

3.3.5.1 CPDLC messages can be exchanged when a connection is Active.

3.3.5.2 CPDLC messages cannot be exchanged when a connection is Inactive.

3.3.5.3 FANS 1/A aircraft can have two CPDLC connections established, each with a different ATSU. Only one of these connections can be Active at any given time. An Inactive connection becomes Active as soon as the Active connection is terminated.

3.3.6 Once a CPDLC connection is established, subsequent CPDLC connections will be initiated by each ATSU, as the aircraft transits from one CPDLC OCA to another.

3.4 Next Data Authority

3.4.1 The ATSU holding the Active CPDLC connection with the aircraft is the CDA.

3.4.2 The only other ATSU that can establish a CPDLC connection with the aircraft while an Active CPDLC connection exists is the Next Data Authority (NDA).

3.4.3 The CDA establishes the NDA by sending an NDA message to the aircraft. The avionics must receive the NDA message prior to receiving a connection request message from the NDA; otherwise the connection request will be rejected.

3.4.4 The CPDLC connection held by the NDA is Inactive. This connection becomes Active when the NDA becomes the CDA.

3.5 Terminating the Active CPDLC Connection

3.5.1 Under normal conditions, the CDA initiates the CPDLC connection termination sequence by sending an END SERVICE uplink message.

3.5.2 In response to an END SERVICE message:

a) The avionics will downlink a DISCONNECT message. The avionics will consider the aircraft to be disconnected from the CDA as soon as the DISCONNECT message is sent.

b) The Active CPDLC connection will be terminated, which will cause the Inactive CPDLC connection (if established) to become the Active CPDLC connection.

c) The NDA (if any) will now become the CDA and be able to exchange CPDLC messages with the aircraft.

3.5.3 It is the responsibility of the CDA to either:

3.5.3.1 ensure that no uplink messages remain open before sending the END SERVICE message; or

3.5.3.2 coordinate with the NDA with reference to messages which were open when the END SERVICE message was sent.

4 Abnormal CPDLC Termination Situations

4.1 Cautions with the END SERVICE Message

4.1.1 If any downlink messages remain open when the aircraft receives an END SERVICE message, the avionics will abort these messages and terminate the CPDLC connection with the CDA. This will not affect the sequence of events reference the CPDLC connection with the NDA as detailed in paragraph 3.5.2.

4.1.2 If any uplink messages remain open when the aircraft receives an END SERVICE message, the avionics will abort these messages and terminate the CPDLC connections with the CDA. For FANS A aircraft, the CPDLC connection with the NDA will also be terminated; in this case, the aircraft must complete another AFN Logon in order to establish an active CPDLC connection with the ATSU that was nominated as the NDA.

4.1.3 If an END SERVICE message is included as part of a multi-element message, and none of those elements requires a WILCO response, the avionics will terminate the Active CPDLC connection.

4.1.4 If an END SERVICE message is included as part of a multi-element message and at least one of those elements requires a WILCO response and:

a) WILCO is sent, the connection with the CDA will be terminated, and the connection with the NDA (if any) will become Active;

b) UNABLE is sent, the END SERVICE message will be ignored; the Active connection with the CDA will **not** be terminated and the NDA will continue to have an Inactive connection; or

c) STANDBY is sent, the END SERVICE message will be ignored; the Active connection with the CDA will **not** be terminated and the NDA will continue to have an Inactive connection.

1. If WILCO is sent subsequently, the connection with the CDA will be terminated, and the connection with the NDA (if any) will become Active; or

2. If UNABLE is sent subsequently, the END SERVICE message will continue to be ignored; the Active connection with the CDA will **not** be terminated and the NDA will continue to have an Inactive connection.

4.1.5 In initial CPDLC implementations, the END SERVICE message will generally be sent alone.

4.2 Non-delivery of End Service

4.2.1 In unusual circumstances, the END SERVICE message may not trigger the disconnection sequence, or the END SERVICE message may not reach the aircraft.

4.2.2 If the controller becomes aware that such a situation has occurred, the pilot should be instructed via voice to terminate the connection.

4.2.3 If the flight crew becomes aware that such a situation has occurred, he/she should advise ATC via voice and manually disconnect from the current ATSU.

4.2.4 In order to resume FANS 1/A data link operations, the flight crew will have to initiate an AFN Logon to the appropriate ATSU.

4.3 CPDLC Dialogue Interruption

4.3.1 If a CPDLC dialogue is interrupted by a system shutdown, the entire dialogue should be re-commenced via voice communication.

5 Managing CPDLC Messages

5.1 General

5.1.1 Where possible, use defined message elements rather than freetext messages. Instructions which modify the flight profile should **not** be sent using freetext. (see also paragraph 5.6.1)

5.1.2 Uplink clearances or instructions should not include message elements that are not dependent on one another. Message elements cannot be responded to separately; the WILCO or UNABLE applies to the entire message. Confusion could result if only part of a clearance or instruction could be complied with.

5.1.3 Downlink requests should not include message elements that are not dependent on one another. Since any response applies to the entire message, confusion could result if only part of the request could be granted. Additionally, if independent requests are included in separate messages, only those that cannot be approved will receive an UNABLE response.

5.1.4 Up to five message elements can be sent within the same message, but the number of elements should be kept to a minimum.

5.1.5 ATC clearances should always receive either a STANDBY, WILCO or UNABLE response. Any other response will result in a voice contact for clarification.

5.1.6 Sending duplicate CPDLC messages could result in misunderstandings or having open messages remaining in the CPDLC connection at the time of transfer to the NDA. If a response is not received in a reasonable amount of time, make inquiries via voice, rather than re-sending the message. This would not apply if an error message indicating non-delivery had been received. In that instance, re-sending the message or using voice would be at the discretion of the pilot or controller concerned.

5.2 Open and Closed Messages

5.2.1 Each message element has, as part of its attributes, the type(s) of response(s) required, if any.

5.2.2 A message that does not contain a message element that requires a response is a closed message.

5.2.3 An open message contains at least one message element that requires a response. Once the response is received, the message becomes closed. Although an acceptable response for some message elements, STANDBY will not close a message.

5.2.4 A CPDLC dialogue consists of a series of messages beginning with an open message and ending when all messages in the dialogue have been closed.

5.3 Message Identification Numbers

5.3.1 During each CPDLC connection, every uplink and downlink message will be assigned a unique Message Identification number (MIN). The MINs for uplink messages will be assigned by the ground system, and those for downlink messages by the avionics.

5.3.2 MINs should be assigned sequentially to each uplink message within each CPDLC connection by the ground system. Some, but not all, avionics systems will assign MINs to downlink messages sequentially. MINs are not associated with particular message elements, only with a particular message sent by either the ground system or the avionics during each CPDLC connection.

5.3.3 Appendix D contains examples of CPDLC dialogues illustrating the use of MINs.

5.4 Message Reference Numbers

5.4.1 Message Reference Numbers (MRNs) are directly related to MINs.

5.4.2 When responding to a message, the MIN from that message is included, re-labeled as the MRN. This relates responses to the messages that prompted them.

5.4.3 It is the responsibility of each system to correctly pair off the response with the related original message in order to close a dialogue (see also 8.5).

5.4.4 Appendix D contains examples of CPDLC dialogues illustrating the use of MRNs.

5.5 Defined Message Elements

5.5.1 The defined message elements intended for use during Phases 1, 2 and 3 are provided in Appendix A. The use of defined message elements:

a) allows for the possibility of automatic message processing;

b) allows for the possibility of systems providing a menu of appropriate responses to particular message elements, thereby reducing workload and the probability of inappropriate responses;

c) reduces the probability of input errors; and

d) reduces the probability of misunderstandings.

5.6 Freetext Messages

5.6.1 Uplink freetext messages require that the flight crew send **DM3** ROGER prior to responding to the content of the message. For that reason, among others, ATC clearances should **not** be issued using freetext.

5.6.2 Except for messages containing **DM68** (see Appendix B) downlink freetext messages do not require a closure response. Responses to non-distress freetext messages should not include MRNs. (see also 8.5)

5.6.3 When a freetext message is required, standard ATC phraseology and format should be used.

5.6.4 Non-essential words and phrases should be avoided. Abbreviations should only be included in freetext messages when they form part of standard ICAO phraseology.

5.6.5 ATSUs may develop lists of standard freetext messages, defining their intent. Efforts have been made to develop a common list for use within CPDLC trials airspace. This list can be found at Appendix F.

5.7 Altitude Messages

5.7.1 **UM129** REPORT LEVEL [level] will be appended to every altitude clearance where a single level is assigned.

5.7.2 **UM175** REPORT REACHING [level] should not be used to determine when an aircraft is *level* at the specified level. The programmed intent of this message element is to request a report if the aircraft *occupies* the specified level, which occurs as the aircraft is about to level at the specified level, but also occurs if the aircraft *passes through* the specified level during a climb or descent.

5.7.3 **UM119** MAINTAIN [level] will be included as the first message element in messages containing conditional altitude clearance message elements (see Table 6 **UM21**, **UM22**, **UM24** and **UM25**). Including this message element will emphasize that the message contains a conditional altitude clearance and may prevent such clearances being executed prematurely.

5.7.4 In the event that ATC is not able to approve a request to climb or descend to a particular level, but is able to approve a climb or descent to an intermediate level:

a) ATC will respond to the request with a clearance to the intermediate level; and

b) include standard freetext message 007: UNABLE REQUESTED LEVEL.

5.8 Route Messages

5.8.1 Any uplink or downlink element containing route information should not contain geographic coordinates encoded as per ARINC specification 424. Some coordinates encoded in this format could be mistaken for entirely different coordinates.

6 Responsibilities

6.1 ATS Provider

6.1.1 Each ATS provider will notify users of the current Phase of CPDLC operational trials applicable in its airspace via NOTAM.

6.1.2 An ATS provider may suspend CPDLC (including operational trials) for the control area under its jurisdiction.

6.1.3 When an ATS provider suspends CPDLC operations or when a planned system shutdown of the communications network or the ATS system occurs, the ATS provider should publish a NOTAM to inform all affected parties of the shutdown period. During this time period, voice communications will be used. Aircraft currently in communication with the ATC unit should be informed by voice of any imminent loss of CPDLC service.

6.1.4 In the event of an unexpected ground system CPDLC outage, or in the event that an ATSU suspends CPDLC operations without prior notice, the ATSU will:

a) inform aircraft currently in communication with the ATC unit of the loss of CPDLC service.

b) inform other ATS units concerned;

c) specifically advise whether the outage also affects ADS service; and

d) issue a NOTAM, if required.

6.1.5 ATSUs will develop procedures to ensure the END SERVICE message is sent: (see also 8.6)

a) in sufficient time to allow the NDA (if established) to establish an Active CPDLC connection prior to the aircraft crossing the common boundary;

b) in sufficient time to prevent an inappropriate Active CPDLC connection from continuing with an aircraft while it is transiting non-CPDLC airspace; and

c) in accordance with inter-unit coordination requirements contained in applicable Agreements.

6.2 Aircraft Operators

6.2.1 Advisory information distributed within the flight operations department of an airline should ensure that all personnel concerned are aware of FANS 1/A concepts and any necessary programs for the introduction of CPDLC.

6.2.2 Operators should assess operational requirements, establish policy and procedures, and incorporate in appropriate company documents.

6.2.3 Company Operations Manuals and other documentation for FANS 1/A should include:

a) crew procedures;

b) flight crew responsibility for establishing and maintaining voice communications (SELCAL) with the appropriate OCA/FIRs; and

c) Minimum Equipment Lists (MEL) modifications (if required) for CPDLC operations.

6.2.4 Operators should ensure that the proper information is included in the ATC Flight Plan. (see also 7.1)

6.2.5 The use of HF data link for FANS 1/A ATS messages is not approved at this time.

6.2.6 Operators should inform the FCMA of any pilot reported problems associated with CPDLC.

6.2.7 Filing a report with the FCMA does not replace the ATS incident reporting procedures and requirements, as specified in ICAO Doc 4444, Appendix 1; ICAO Doc 9426, Chapter 3; or applicable State regulations affecting parties involved in a potential ATS incident.

6.3 Data link Service Provider

6.3.1 For those situations where service providers cannot continue to provide FANS 1/A data link communications, they will inform ATS and Airline Operations in accordance with established coordination procedures. ATS will then take the appropriate actions as specified in 6.1.3 and 6.1.4.

7 Procedures

7.1 Flight Planning

7.1.1 The aircraft registration is required in Field 18. If the aircraft registration is missing, or different from that contained in the AFN CONTACT message, the ground system will not establish a CPDLC connection with that aircraft.

7.1.2 Hyphens contained in an aircraft registration must not be entered into the ICAO flight plan form.

7.2 Air Traffic Control

7.2.1 Where CPDLC-related voice communications are required, utilize the appropriate phraseology as detailed in Appendix E.

7.2.2 When CPDLC fails and communications revert to voice, all open messages should be considered not delivered and any dialogues involving those messages should be re-commenced by voice.

7.2.3 Initiate voice contact to clarify the meaning or intent if an unexpected or inappropriate response is received to an uplink message. (see also 5.1.5)

7.2.4 Immediately revert to voice communications if at any time it appears that there is a misunderstanding about the intent of a CPDLC dialogue.

7.2.5 If possible, all open messages should be closed, regardless of any associated voice communications. These responses should be consistent with the voice communication, in order to prevent confusion.

7.2.6 Up to five message elements can be sent within the same message, but the number of elements should be kept to a minimum. Messages should not include ATC clearances or instructions that are not dependent on one another. Misunderstanding could result if only part of such a message could be complied with.

7.2.7 If the controller becomes aware that the AFN Logon to the NDA is not successful, the controller should instruct the aircraft to manually initiate an AFN Logon with the next ATSU (see Appendix E). Do not re-send the NDA message. (see also 8.2)

7.2.7.1 Coordinate with the next ATSU, establishing clearly when or where the aircraft will be instructed to initiate AFN Logon with that unit.

7.2.7.2 The AFN Logon instruction should be timed to allow the next ATSU to establish an Active CPDLC connection prior to the aircraft's crossing the common boundary. Note that this process will terminate the current CPDLC connection.

7.2.8 Do not include any other message element with the END SERVICE message. (see also 4.1.3 and 4.1.4)

7.2.9 Appropriate responses to any received downlink messages should be sent prior to sending the END SERVICE message.

7.2.10 If an NDA was established, coordinate with that ATSU with reference to any CPDLC uplink messages that were open at the time the END SERVICE message was sent.

7.3 Flight Crew - General

The following procedures apply to all Phases of CPDLC Operational Trials.

7.3.1 When initializing the FMC, it is essential to ensure that the aircraft identification/call-sign/flight ID matches the one displayed in the filed ATC flight plan. If the aircraft identification/call-sign/flight ID and registration contained in the AFN CONTACT message do not match what is provided in the flight plan, the AFN Logon will be rejected.

7.3.2 In the Shanwick FIR, the AFN Logon will be rejected unless the oceanic clearance has been issued to the flight. As well, the Shanwick system will reject AFN logons from westbound flights proceeding into or transiting the Madrid FIR, because the limited benefit for such flights does not justify the workload associated with providing CPDLC services to them.

7.3.3 If an AFN Logon is rejected:

a) check whether the aircraft identification/call-sign/flight ID in the FMC matches the aircraft identification/call-sign/flight ID provided in the flight plan and make corrections if necessary;

b) check whether the aircraft registration matches the aircraft registration provided in the flight plan, and arrange for the flight plan to be modified, if necessary;

c) attempt another AFN Logon after receipt of the oceanic clearance; or

d) do not attempt another AFN Logon if the flight is westbound in the Shanwick FIR and will proceed into or transit the Madrid FIR.

7.3.4 If entering CPDLC or ADS airspace via departure from an airport adjacent to, or underlying the airspace, initiate AFN Logon with the appropriate ATSU prior to departure, unless the circumstances noted in 7.3.2 pertain to the flight. (**Note**: standard ATS procedures require that when an ATSU is in communication with a flight under the control of another ATSU, no clearances or instructions are given to that flight without the appropriate coordination between the ATSU's.)

7.3.5 If entering a CPDLC OCA/FIR from adjacent airspace where no CPDLC connections have been established, initiate AFN Logon to the CPDLC ATSU between 15 and 45 minutes prior to entering the CPDLC OCA/FIR unless the circumstances noted in 7.3.2 pertain to the flight. (see also the Note at paragraph 7.3.4 above.)

7.3.6 If, after initiating an AFN Logon, the Active Centre does not match the ATSU specified during the Logon, the flight crew should clarify the situation via voice.

7.3.7 CPDLC transfers to adjacent ATSUs offering CPDLC services should be automatic. Normally, the transfer will occur at or shortly before crossing the OCA/FIR boundary. When the ATSU intends the transfer to take place after the OCA/FIR boundary, standard freetext message 006 (see Appendix F) will be uplinked. When a flight does **not** receive standard freetext message 006 and crosses and OCA/FIR boundary without the active Center changing to reflect the transfer, flight crews should manually disconnect and logon to the appropriate ATSU.

7.3.8 When exiting a CPDLC OCA/FIR into a non-CPDLC OCA/FIR flight crews should expect the Active Centre to terminate the CPDLC connection, leaving the aircraft with no CPDLC connectivity. Normally, the transfer will occur at or shortly before crossing the OCA/FIR boundary. When the ATSU intends the transfer to take place after the OCA/FIR boundary, standard freetext message 006 (see Appendix F) will be uplinked. When a flight does **not** receive standard freetext message 006 and crosses and OCA/FIR boundary without the CPDLC connection being terminated, flight crews should manually disconnect. Crews should follow the direction at 7.3.5 if entering a subsequent CPDLC OCA/FIR.

7.3.9 Unless otherwise instructed, flight crews should revert to voice communications while transiting non-CPDLC OCA/FIRs. Crews should note that an active CPDLC connection may be established with the next CPDLC OCA/FIR well before entering that OCA/FIR. Such connections should not be utilized except in highly unusual or emergency situations.

7.3.10 Where CPDLC-related voice communications are required, utilize the appropriate phraseology as detailed in Appendix E.

7.3.11 Initial contact and SELCAL check (if SELCAL will be used to monitor HF) with the appropriate aeradio station are essential requirements prior to entering oceanic airspace and each OCA/FIR along the route of flight.

7.3.12 If no domestic frequency assignment has been received by 10 minutes prior to the flight's entry into domestic airspace, contact aeradio and request the frequency, stating the oceanic exit fix.

7.3.13 Flight crews should be aware of paragraph 4.1.2 concerning END SERVICE. For this reason, it is important to respond to uplink messages promptly and appropriately, particularly when approaching an FIR boundary. It should be noted that if any uplink messages are open when the END SERVICE message is sent, the CPDLC connection to the CDA will be terminated and the CPDLC connection to the NDA may be terminated.

7.3.14 If unable to continue using CPDLC, flight crews should revert to voice procedures.

7.3.15 Flight crews should be aware of the Expected Responses to particular downlink message elements listed in Appendix A, Table 1, Table 3 and Table 5. If one of the Expected Responses are not received, the flight crew should initiate voice contact to clarify the situation.

7.3.16 If possible, all open messages should be closed, regardless of any associated voice communications. These responses should be consistent with the voice communication, in order to prevent confusion.

7.4 Flight Crew –Contact with Aeradio

The integrity of the ATC service remains wholly dependent on establishing and maintaining HF or VHF voice communications. During implementation of CPDLC, specific Air Traffic Service Providers may be in various stages of development and testing.

7.4.1 Prior to entering each oceanic CTA, the pilot shall contact the appropriate aeradio station.

7.4.2 If the flight will exit the CTA into oceanic airspace, on initial contact the pilot shall:

a) not include a position report;

b) use the term "C-P-D-L-C" after the aircraft call sign;

c) state the name of the next OCA/FIR to be entered; and

d) request the SELCAL check.

Example: KLM634 C-P-D-L-C, SHANWICK NEXT, REQUEST SELCAL CHECK CDAB.

Expect to either receive the frequencies for the stated OCA/FIR or to be advised frequencies will be assigned via CPDLC.

7.4.3 If the flight will exit the CTA into domestic airspace, on initial contact the pilot shall:

a) not include a position report;

b) use the term "C-P-D-L-C" after the aircraft call sign;

c) state the track letter if operating on the Organized Track System (OTS);

d) state the last two fixes in the cleared route of flight if operating outside the OTS; and

e) request the SELCAL check.

Example 1: KLM634 C-P-D-L-C, TRACK BRAVO, REQUEST SELCAL CHECK CDAB.

Example 2: SWR126 C-P-D-L-C, SCROD VALIE, REQUEST SELCAL CHECK DMCS.

Expect to receive the domestic frequencies or to be advised the frequencies will be assigned via CPDLC.

7.4.4 Continue to use the term "C-P-D-L-C" until the SELCAL check has been completed, the frequency assignment has been received or advised the frequency will be assigned via CPDLC.

7.4.5 If a frequency assignment is not received prior to crossing an OCA/FIR boundary, contact the appropriate aeradio station.

7.4.6 When an onboard systems failure prevents CPDLC, or if CPDLC is terminated due to FANS 1/A problems:

a) if the failure occurs prior to initial contact with the aeradio station, do not use the phrase “C-P-D-L-C”; and

b) inform Company Operations Department in accordance with established problem reporting procedures.

7.4.7 When leaving CPDLC airspace, resume:

7.4.7.1 ADS procedures if entering ADS airspace; or

7.4.7.2 normal voice procedures if entering non-FANS 1/A airspace.

7.5 Aeradio

7.5.1 If an OCA/FIR implements Phase 2 operational trials:

a) some aeradio operators will advise CPDLC flights that frequencies will be provided via CPDLC; while

b) other aeradio operators will continue to provide frequency assignments.

7.5.2 Aeradio operators shall:

a) respond to an aircraft that identifies itself as "C-P-D-L-C" by restating "C-P-D-L-C" in conjunction with the aircraft call-sign; and

b) complete the SELCAL check.

7.5.3 Aeradio operators serving ATSUs that are participating in ADS WPR operational trials but not in CPDLC operational trials shall:

a) advise aircraft that:
"CPDLC SERVICE NOT AVAILABLE IN (name) OCA/FIR. VOICE REPORTS NOT REQUIRED IN (name) OCA/FIR"; and

b) issue:

1. communication instructions for the next OCA/FIR; or
2. communication instructions and the frequency to contact the appropriate ATS unit approaching, or over, the exit point; or
3. instructions for the aircraft to call the aeradio station serving the next OCA/FIR at a time or location prior to the exit OCA/FIR boundary or exit point.

7.5.4 Aeradio operators serving ATSUs that are participating in ADS WPR operational trials and in CPDLC operational trials shall advise aircraft that:
"VOICE REPORTS NOT REQUIRED IN (name) OCA/FIR"; and

a) advise aircraft that:
"(type) FREQUENCIES WILL BE ASSIGNED VIA CPDLC"; or

b) issue:

1. communication instructions for the next OCA/FIR; or
2. communication instructions and the frequency to contact the appropriate ATS unit approaching, or over, the exit point; or
3. instructions for the aircraft to call the aeradio station serving the next OCA/FIR at a time or location prior to the OCA/FIR boundary or exit point.

7.6 Emergency Messages During Operational Trials

7.6.1 It is expected that, in an emergency, flight crews will immediately revert to voice communications. This does not preclude crews from using CPDLC for emergency communications if unable to establish voice contact.

7.6.2 Any downlink message that contains an emergency message element (see Appendix B) should be treated as an emergency message.

7.6.3 If another message element is included in an emergency message and that message element is not included in the list of Phase 2 downlink message elements (See Appendix A, Table 3) the message will be rejected by the phase 1 and 2 Shanwick ground system and not presented to the controller. Crews of all Boeing aircraft should be aware that it is not possible to send **DM56** MAYDAY MAYDAY MAYDAY without also sending **DM48** POSITION REPORT [position report]. Additionally, crews of B777 aircraft should be aware it is not possible to send **DM55** PAN PAN PAN without also sending **DM48**. Because **DM48** is not recognized by the Phase 1 and 2 Shanwick ground system, any message containing this message element during these Phases will be rejected and not presented to the controller.

7.6.4 In the event that a controller receives an emergency downlink message he/she should take immediate action to confirm the status and intentions of the aircraft via voice.

7.6.5 Upon receipt of an emergency downlink message, the controller shall indicate to the aircraft that the message was received by:

7.6.5.1 responding with standard freetext message 004: ROGER PAN if the message contains **DM55** PAN PAN PAN;

7.6.5.2 responding with standard freetext message 005: ROGER MAYDAY if the message contains **DM56** MAYDAY MAYDAY MAYDAY; or

7.6.5.3 responding with **UM3** ROGER if the message contains **DM57**, **DM58**, **DM59**, **DM60** or **DM61**.

7.6.6 If an emergency downlink message is inadvertently sent, the flight crew should send **DM58** CANCEL EMERGENCY as soon as practicable. After sending **DM58**, the flight crew should confirm their status and intentions via voice.

7.6.7 Once an emergency downlink message is received, controllers will consider the aircraft to be in an emergency state until confirmed otherwise via voice contact with the flight crew.

7.6.8 Controllers should be aware that altitude information included with **DM55** or **DM56** may not be reliable. In some cases, this information is included automatically and may not accurately reflect the current altitude or attitude of the aircraft nor the intentions of the flight crew.

8 ATC Automation

8.1 AFN Logon

8.1.1 To ensure that CPDLC messages are sent only to aircraft for which the ATSU has a complete flight plan, an AFN Logon should be rejected if:

a) the aircraft registration in the AFN CONTACT message does not match the aircraft registration in the flight plan;

b) the flight plan does not contain the aircraft registration; or

c) there is no flight plan in the FDPS for the flight.

8.1.2 The Shanwick system will be configured to reject AFN Logons from flights that have not been issued oceanic clearances and from westbound flights that will proceed into or transit the Madrid FIR.

8.1.3 Some ATSUs may implement processes to allow CPDLC connections only with approved Operators or aircraft registrations. If implemented, these processes will result in the AFN Logon being rejected, unless the Operator or aircraft registration is approved.

8.1.4 Hyphens contained in an aircraft registration should not be entered into the ICAO flight plan form. Ground systems should be configured so as to prevent the AFN Logon being rejected due to hyphens being included in the aircraft registration sent in the AFN CONTACT message, but not in the flight plan.

8.2 AFN Complete

8.2.1 It is recommended that ATSUs implement a time parameter of 20 minutes maximum between the sending of the AFN CONTACT ADVISORY message and the receipt of the AFN COMPLETE message.

8.2.2 If the AFN COMPLETE message is not received within the time parameter, the controller should be alerted, so that he/she may take the actions prescribed in paragraph 7.2.7.

8.3 Emergency Message Element Handling

8.3.1 Ground systems should be configured so as to provide a clear indication to controllers of downlinked messages which contain any of the message elements from the Emergency Message Set. (see Appendix B)

8.4 Automated Responses

8.4.1 Ground systems should be configured so as to automatically respond to requests for re-clearance (**DM6**, **DM9**, **DM10** or **DM18**) with:

8.4.1.1 standard freetext message 001 or 002 as appropriate (see Appendix F), during Phase 1 and Phase 2 Operational Trials; and

8.4.1.2 **UM1** STANDBY during Phase 3 Operational Trials.

8.5 MRNs

8.5.1 Any downlink message that contains at least one message element that technically requires a response is a message that technically requires a response.

8.5.2 With the exception of **UM1** STANDBY, only one uplink message in response to a particular downlink message should have a MRN. If two uplink messages are sent with the same MRN, and neither of those messages is **UM1** STANDBY, the second message will be discarded by the avionics and not displayed to the flight crew.

8.5.3 If an uplink message is sent with a MRN and the downlink message with the associated MIN did not technically require a response, the uplink message will be discarded by the avionics and not displayed to the flight crew.

8.5.4 If an uplink message is discarded for the reasons described in 8.5.2 or 8.5.3 above, an error message will be sent to the ground system advising that the MRN was not recognized.

8.5.5 Ground systems should be configured such that uplink messages will have MRNs only if the uplink message is responding to a downlink message that technically requires a response.

8.5.6 Ground systems should be configured such that only one uplink message, other than **UM1** STANDBY, will have the MRN which associates it with a particular downlink message.

8.6 Sending the END SERVICE Message

8.6.1 ATSUs may automate the sending of the END SERVICE message, based upon the estimated time aircraft are expected to cross OCA/FIR boundaries.

8.6.2 The parameters for this operation should be detailed in inter-unit Agreements. (see also 6.1.5)

Appendix A - CPDLC Message Sets - Phased

When referring to message elements, the format is **DMnumber** or **UMnumber**; where the **number** is referenced as per Data link Initiatives in the North Atlantic (NAT) Region, Part 4, Appendix E.

If a downlink message element is sent that is not appropriate for the current CPDLC Operational Phase, the aircraft will receive **UM169** (standard freetext message 003) MESSAGE NOT SUPPORTED BY THIS FACILITY. The complete list of standard freetext messages for use in the NAT can be found at Appendix F.

The word 'level' is used in preference to the word 'altitude' as it refers to both flight levels and altitudes.

Message Sets for Phase 1

Phase 1 downlink message elements		
Message #	**Message Element**	**Expected Response**
DM3	ROGER	Nil
DM6	REQUEST [level]	**UM169** (standard freetext message 001) or **UM169** (standard freetext message 002)
DM9	REQUEST CLIMB TO [level]	**UM169** (standard freetext message 001) or **UM169** (standard freetext message 002)
DM10	REQUEST DESCENT TO [level]	**UM169** (standard freetext message 001) or **UM169** (standard freetext message 002)
DM18	REQUEST [speed]	**UM169** (standard freetext message 001) or **UM169** (standard freetext message 002)
DM65	DUE TO WEATHER	Nil
DM66	DUE TO AIRCRAFT PERFORMANCE	Nil

Table 1

Phase 1 uplink message elements		
Message #	**Message Element**	**Expected Response**
UM3	ROGER	Nil
UM161	END SERVICE	Nil
UM169	(standard freetext message 001)	**DM3** ROGER
Um169	(standard freetext message 002)	**DM3** ROGER
UM169	(standard freetext message 003)	**DM3** ROGER
UM169	(standard freetext message 004)	**DM3** ROGER *
UM169	(standard freetext message 005)	**DM3** ROGER *
UM169	(standard freetext message 006)	**DM3** ROGER *f*

Table 2

*** DM3** is required to close an uplink freetext message. However, since these particular uplinks are in response to emergency downlink messages, sending the expected response would be at the discretion of the flight crew.

Message Sets for Phase 2

Phase 2 downlink message elements		
Message #	**Message Element**	**Expected Response**
DM0	WILCO	Nil
DM1	UNABLE	Nil
DM2	STANDBY	Nil
DM3	ROGER	Nil
DM6	REQUEST [level]	**UM169** (standard freetext message 001) or **UM169** (standard freetext message 002)
DM9	REQUEST CLIMB TO [level]	**UM169** (standard freetext message 001) or **UM169** (standard freetext message 002)
DM10	REQUEST DESCENT TO [level]	**UM169** (standard freetext message 001) or **UM169** (standard freetext message 002)
DM18	REQUEST [speed]	**UM169** (standard freetext message 001) or **UM169** (standard freetext message 002)
DM65	DUE TO WEATHER	Nil
DM66	DUE TO AIRCRAFT PERFORMANCE	Nil

Table 3

Phase 2 uplink message elements		
Message #	**Message Element**	**Expected Response**
UM3	ROGER	Nil
UM118	AT [position] CONTACT [icaounitname] [frequency]	**DM0** WILCO, **DM1** UNABLE, or **DM2** STANDBY
UM119	AT [time] CONTACT [icaounitname] [frequency]	**DM0** WILCO, **DM1** UNABLE, or **DM2** STANDBY
UM161	END SERVICE	Nil
UM169	(standard freetext message 001)	**DM3** ROGER
Um169	(standard freetext message 002)	**DM3** ROGER
UM169	(standard freetext message 003)	**DM3** ROGER
UM169	(standard freetext message 004)	**DM3** ROGER *
UM169	(standard freetext message 005)	**DM3** ROGER *
UM169	(standard freetext message 006)	**DM3** ROGER *ƒ*

Table 4

*** DM3** is required to close an uplink freetext message. However, since these particular uplinks are in response to emergency downlink messages, sending the expected response will be at the discretion of the flight crew.

Message Sets for Phase 3

Phase 3 downlink message elements		
Message #	**Message Element**	**Expected Response**
DM0	WILCO	Nil
DM1	UNABLE	Nil
DM2	STANDBY	Nil
DM3	ROGER	Nil
DM6	REQUEST [level]	**UM1** STANDBY *
DM9	REQUEST CLIMB TO [level]	**UM1** STANDBY *
DM10	REQUEST DESCENT TO [level]	**UM1** STANDBY *
DM18	REQUEST [speed]	**UM1** STANDBY *
DM28	LEAVING [level]	Nil
DM37	LEVEL [level]	Nil
DM65	DUE TO WEATHER	Nil
DM66	DUE TO AIRCRAFT PERFORMANCE	Nil
DM67b	WE CAN ACCEPT [level] AT [time]	Nil
DM67c	WE CAN ACCEPT [speed] AT [time]	Nil
DM67e	WE CANNOT ACCEPT [level]	Nil
DM67f	WE CANNOT ACCEPT [speed]	Nil
DM72 **	REACHING [level]	Nil

Table 5

* If **UM1** STANDBY is not received, or any other message is received, flight crews should verify the situation via voice.

** **DM72** advises that an aircraft has *reached* the specified level. This may not be the same as being *level* at the specified level.

Phase 3 uplink message elements		
Message #	**Message Element**	**Expected Response**
UM0	UNABLE	Nil
UM1	STANDBY	Nil
UM3	ROGER	Nil
UM19	MAINTAIN [level]	**DM0** WILCO, **DM1** UNABLE, or **DM2** STANDBY
UM20	CLIMB TO AND MAINTAIN [level]	**DM0** WILCO, **DM1** UNABLE, or **DM2** STANDBY
UM21 *	AT [time] CLIMB TO AND MAINTAIN [level]	**DM0** WILCO, **DM1** UNABLE, or **DM2** STANDBY
UM22 *	AT [position] CLIMB TO AND MAINTAIN [level]	**DM0** WILCO, **DM1** UNABLE, or **DM2** STANDBY
UM23	DESCEND TO AND MAINTAIN [level]	**DM0** WILCO, **DM1** UNABLE, or **DM2** STANDBY
UM24 *	AT [time] DESCEND TO AND MAINTAIN [level]	**DM0** WILCO, **DM1** UNABLE, or **DM2** STANDBY
UM25 *	AT [position] DESCEND TO AND MAINTAIN [level]	**DM0** WILCO, **DM1** UNABLE, or **DM2** STANDBY
UM26	CLIMB TO REACH [level] BY [time]	**DM0** WILCO, **DM1** UNABLE, or **DM2** STANDBY
UM27	CLIMB TO REACH [level] BY [position]	**DM0** WILCO, **DM1** UNABLE, or **DM2** STANDBY
UM28	DESCEND TO REACH [level] BY [time]	**DM0** WILCO, **DM1** UNABLE, or **DM2** STANDBY
UM29	DESCEND TO REACH [level] BY [position]	**DM0** WILCO, **DM1** UNABLE, or **DM2** STANDBY
UM80	CLEARED [route clearance]	**DM0** WILCO, **DM1** UNABLE, or **DM2** STANDBY
UM83	AT [position] CLEARED [route clearance]	**DM0** WILCO, **DM1** UNABLE, or **DM2** STANDBY
UM106	MAINTAIN [speed]	**DM0** WILCO, **DM1** UNABLE, or **DM2** STANDBY
UM111	INCREASE SPEED TO [speed]	**DM0** WILCO, **DM1** UNABLE, or **DM2** STANDBY
UM113	REDUCE SPEED TO [speed]	**DM0** WILCO, **DM1** UNABLE, or **DM2** STANDBY
UM118	AT [position] CONTACT [icaounitname] [frequency]	**DM0** WILCO, **DM1** UNABLE, or **DM2** STANDBY
UM119	AT [time] CONTACT [icaounitname] [frequency]	**DM0** WILCO, **DM1** UNABLE, or **DM2** STANDBY
UM128	REPORT LEAVING [level]	**DM3** ROGER
UM129	REPORT LEVEL [level]	**DM3** ROGER
UM148	WHEN CAN YOU ACCEPT [level]	**DM67b** WE CAN ACCEPT [level] AT [time] or **DM67e** WE CANNOT ACCEPT [level]
UM151	WHEN CAN YOU ACCEPT [speed]	**DM67c** WE CAN ACCEPT [speed] AT [time] or **DM67f** WE CANNOT ACCEPT [speed]

Table 6

* When using these elements to issue a conditional clearance, ensure that **UM19** MAINTAIN [level] is included as the first message element, inserting the currently assigned level.

Phase 3 uplink message elements - continued		
Message #	**Message Element**	**Expected Response**
UM161	END SERVICE	Nil
UM166	DUE TO TRAFFIC	Nil **
UM167	DUE TO AIRSPACE RESTRICTION	Nil **
UM169	(standard freetext message 001)	**DM3** ROGER
Um169	(standard freetext message 002)	**DM3** ROGER
UM169	(standard freetext message 003)	**DM3** ROGER
UM169	(standard freetext message 004)	**DM3** ROGER *ƒ*
UM169	(standard freetext message 005)	**DM3** ROGER *ƒ*
UM169	(standard freetext message 006)	**DM3** ROGER *ƒ*
UM169	(standard freetext message 007)	**DM3** ROGER
UM175	REPORT REACHING [level] *ƒƒ*	**DM3** ROGER

Table 6 - continued

** This message element would be sent in conjunction with another uplink message element which might have an expected response

ƒ **DM3** is required to close an uplink freetext message. However, since these particular uplinks are in response to emergency downlink messages, sending the expected response will be at the discretion of the flight crew.

ƒƒ This message requests a report when an aircraft *reaches* a particular level. This is not the same as being *level* at that level.

Appendix B - Emergency Downlink Message Elements

Emergency downlink messages do not require a response as part of their attributes. However, emergency downlink messages will receive a response, in order to assure the flight crew that the message has been received, as described in paragraph 7.6.5.

If any of the downlink message elements from this table are sent, flight crews should send **DM58** CANCEL EMERGENCY once the situation has been resolved.

Ground ATC systems should ensure that messages containing these message elements are displayed as priority messages.

Emergency Downlink Message Elements	
Message #	**Message Element**
DM55	PAN PAN PAN
DM56	MAYDAY MAYDAY MAYDAY
DM57	[remaining fuel] OF FUEL REMAINING AND [souls on board] SOULS ON BOARD
DM58	CANCEL EMERGENCY
DM59	DIVERTING TO [position] *or* DIVERTING TO [position] VIA [route]
DM60	OFFSETTING [direction] [distance offset] OF ROUTE
DM61	DESCENDING TO [level]
DM68	*freetext – selecting any of the above message elements will result in this element being enabled for the flight crew to include in the emergency message at their discretion.*

Table 7

Appendix C - CPDLC Dialogues

Phase 1 Altitude request	
Aircraft sends	**Ground sends**
{**DM6**, inserting the requested flight level} REQUEST FL390	
	{**UM169** (standard freetext message 001)} REQUEST RECEIVED RESPONSE WILL BE VIA GANDER AERADIO {note that this message will remain open until **DM3** ROGER is received}
{**DM3**} ROGER	

Table 8

Phase 2 Domestic frequency assignment	
Aircraft sends	**Ground sends**
	{at the appropriate time, the controller sends **UM118**, inserting the position, unit and frequency information} AT SCROD CONTACT GANDER CENTER 133.42 {note that this message will remain open until a WILCO or UNABLE message is received}
{**DM0**} WILCO	

Table 9

Phase 3 Altitude request	
Aircraft sends	**Ground sends**
{**DM6**} REQUEST FL390	
	{usually, the controller will send **UM1** to inform that the request has been received and is being assessed} STANDBY
	{the controller sends, if appropriate, **UM20**, inserting the cleared flight level. One report request, **UM129**, will be included with this type of clearance.} CLIMB TO AND MAINTAIN FL390 REPORT LEVEL FL390 {this message remains open until the receipt of a WILCO or UNABLE message}
{**DM0**} WILCO	
{**DM37**} LEVEL FL390	

Table 10

Any Phase, aircraft sends an unsupported message	
Aircraft sends	**Ground sends**
{**DM15**} REQUEST OFFSET LEFT 15 MILES OF ROUTE	
	{**UM169** (standard freetext message 003)} MESSAGE NOT SUPPORTED BY THIS FACILITY {note that this message remains open until **DM3** ROGER is received}
{**DM3**} ROGER	

Table 11

Appendix D - MIN and MRN Correlation Sequences

For the purposes of these examples, assume that these are two separate CPDLC connections, active at the same time

Note that the MINs should be sequentially assigned by the ground system, within each CPDLC connection. Only some airborne systems follow this numbering convention.

In all cases, the MRN is the MIN of the message to which it responds.

CPDLC connection 1

Aircraft Sends	Ground Sends
REQUEST FL390 MIN=3	
	CLIMB TO FL390 REPORT LEVEL FL390 MIN=9 MRN=3
WILCO MIN=4 MRN=9	
LEVEL FL390 MIN=5	

Table 12

CPDLC connection 2

Aircraft Sends	Ground Sends
REQUEST FL390 MIN=11	
	STANDBY MIN=7 MRN=11
	UNABLE MIN=8 MRN=11
REQUEST FL370 MIN=12	
	STANDBY MIN=9 MRN=12
	CLIMB TO FL370 REPORT LEVEL FL370 MIN=10 MRN=12
WILCO MIN=13 MRN=10	
LEVEL FL370 MIN=14	

Table 13

Appendix E - Voice Phraseology

The phrase “CPDLC” is spoken as “see-pee-dee-ell-see”.

The phrase “ADS” is spoken as “ay-dee-ess”.

ATC Phraseology

To instruct flight crews to manually initiate Logon to the subsequent ATSU:
SELECT ATC COM OFF THEN LOGON TO [ATSU name]

Note: Use the ICAO four character code when identifying the ATSU.
Note: Use this phraseology when the NDA message delivery or address forwarding is unsuccessful or when the END SERVICE message does not terminate the CPDLC connection.

To inform aircraft that the FANS 1/A data link has failed:
DATA LINK FAILED. SELECT ATC COM OFF. CONTINUE ON VOICE.

To advise aircraft prior to the commencement of a FANS 1/A data link shutdown:
DATA LINK WILL BE SHUT DOWN. SELECT ATC COMM OFF. CONTINUE ON VOICE.

To advise that the transmission is being made due to a CPDLC failure:
CPDLC FAILURE.
Note: This phraseology should only be included with the first transmission made for this reason.

To advise of a complete ground system failure:
ALL STATIONS CPDLC FAILURE [identification of station calling].

Pilot Phraseology

To advise ATC that the CPDLC connection is being terminated manually:
CPDLC CONNECTION WITH [current ATSU] TERMINATED. CONNECTING WITH [subsequent ATSU].

Note: The pilot may use the ICAO four-character codes or plain language at his/her discretion.

To advise that the transmission is being made due to a CPDLC failure:
CPDLC FAILURE.
Note: This phraseology should only be included with the first transmission made for this reason.

Appendix F - Standard Freetext Messages for use in NAT CPDLC Trials Airspace

Freetext uplink messages remain open until the receipt of **DM3** ROGER.

It is expected that other NAT provider states will develop messages similar to 001 and 002 for use in their airspace when needed.

Message #	Message Text	Message Intent
001	REQUEST RECEIVED RESPONSE WILL BE VIA GANDER AERADIO	The CPDLC downlink request was: 1) part of the approved message set; and 2) received by the controller. The aircraft will receive any further communication about the request via Gander aeradio.
002	REQUEST RECEIVED RESPONSE WILL BE VIA SHANWICK AERADIO	The CPDLC downlink request was: 1) part of the approved message set; and 2) received by the controller. The aircraft will receive any further communication about the request via Shanwick aeradio.
003	MESSAGE NOT SUPPORTED BY THIS FACILITY	The CPDLC downlink message was not part of the approved message set.
004	ROGER PAN	The controller received **DM55** PAN PAN PAN.
005	ROGER MAYDAY	The controller received **DM56** MAYDAY MAYDAY MAYDAY.
006	EXPECT CPDLC TRANSFER AT [time]	The controller is notifying the pilot that the CPDLC transfer process will be delayed until the specified time. If the CPDLC transfer is not completed by the specified time, the pilot shall manually disconnect and logon to the next centre if appropriate.
007	UNABLE REQUESTED LEVEL	The level requested by the pilot is not available. However, a clearance to a level between the current level and the requested level has been approved. **Note** - this freetext is included in the message containing the clearance to the intermediate level.

Table 14

Appendix G - CPDLC Message Sets - New York

Response Requirements Key

TYPE	CLOSURE RESPONSES
W/U	WILCO, UNABLE, will close the uplink message.
A/N	AFFIRM, NEGATIVE, will close the uplink message.
R	ROGER, will close the uplink message.
NE	Most messages with an NE attribute require an operational response. Only the correct operational response is presented to the pilot. The uplink message is considered to be closed on sending and does not require a response to close the dialogue. The WILCO, UNABLE, AFFIRM, NEGATIVE, ROGER, and STANDBY responses are not enabled for pilot selection.
Y	Response required.
N	Response not required
Note: Under some circumstances, an ERROR message will also close an uplink message.	

Uplink Message Elements

Uplink - Responses and Acknowledgements

UL #	Message Element	Message Intent	Response
0	UNABLE	Indicates that ATS cannot comply with the request.	NE
1	STANDBY	Indicates that ATS has received the message and will respond. *The pilot is informed that the request is being assessed and there will be a short-term delay (within 10 minutes). The exchange is not closed and the request will be responded to when conditions allow.*	NE
2	REQUEST DEFERRED	Indicates that ATS has received the request but it has been deferred until later. *The pilot is informed that the request is being assessed and a long-term delay can be expected. The exchange is not closed and the request will be responded to when conditions allow.*	NE
3	ROGER	Indicates that ATS has received and understood the message.	NE
4	AFFIRM	Yes.	NE
5	NEGATIVE	No.	NE

Uplink - Vertical Clearances

UL #	Message Element	Message Intent	Response
6	EXPECT [altitude]	Notification that a level change instruction should be expected.	R
7	EXPECT CLIMB AT [time]	Notification that an instruction should be expected for the aircraft to commence climb at the specified time.	R
8	EXPECT CLIMB AT [position]	Notification that an instruction should be expected for the aircraft to commence climb at the specified position.	R
9	EXPECT DESCENT AT [time]	Notification that an instruction should be expected for the aircraft to commence descent at the specified time.	R
10	EXPECT DESCENT AT [position]	Notification that an instruction should be expected for the aircraft to commence descent at the specified position.	R
11	EXPECT CRUISE CLIMB AT [time]	Notification that an instruction should be expected for the aircraft to commence cruise climb at the specified time. *Due to different interpretations between the various ATS units this element should be avoided.*	R
12	EXPECT CRUISE CLIMB AT [position]	Notification that an instruction should be expected for the aircraft to commence cruise climb at the specified position. *Due to different interpretations between the various ATS units this element should be avoided.*	R
13	AT [time] EXPECT CLIMB TO [altitude]	Notification that an instruction should be expected for the aircraft to commence climb at the specified time to the specified level.	R
14	AT [position] EXPECT CLIMB TO [altitude]	Notification that an instruction should be expected for the aircraft to commence climb at the specified position to the specified level.	R
15	AT [time] EXPECT DESCENT TO [altitude]	Notification that an instruction should be expected for the aircraft to commence descent at the specified time to the specified level.	R
16	AT [position] EXPECT DESCENT TO [altitude]	Notification that an instruction should be expected for the aircraft to commence descent at the specified position to the specified level.	R
17	AT [time] EXPECT CRUISE CLIMB TO [altitude]	Notification that an instruction should be expected for the aircraft to commence cruise climb at the specified time to the specified level. *Due to different interpretations between the various ATS units this element should be avoided.*	R
18	AT [position] EXPECT CRUISE CLIMB TO [altitude]	Notification that an instruction should be expected for the aircraft to commence cruise climb at the specified position to the specified level. *Due to different interpretations between the various ATS units this element should be avoided.*	R
19	MAINTAIN [altitude]	Instruction to maintain the specified level.	W/U
20	CLIMB TO AND MAINTAIN [altitude]	Instruction that a climb to the specified level is to commence and the level is to be maintained when reached.	W/U
21	AT [time] CLIMB TO AND MAINTAIN [altitude]	Instruction that at the specified time, a climb to the specified level is to commence and once reached the specified level is to be maintained.	W/U
22	AT [position] CLIMB TO AND MAINTAIN [altitude]	Instruction that at the specified position, a climb to the specified level is to commence and once reached the specified level is to be maintained.	W/U

Uplink - Vertical Clearances, continued

UL #	Message Element	Message Intent	Response
23	DESCEND TO AND MAINTAIN [altitude]	Instruction that a descent to the specified level is to commence and once reached the specified level is to be maintained.	
24	AT [time] DESCEND TO AND MAINTAIN [altitude]	Instruction that at the specified time, a descent to the specified level is to commence and once reached the specified level is to be maintained.	W/U
25	AT [position] DESCEND TO AND MAINTAIN [altitude]	Instruction that at the specified position, a descent to the specified level is to commence and once reached the specified level is to be maintained.	W/U
26	CLIMB TO REACH [altitude] BY [time]	Instruction that a climb is to commence at a rate such that the specified level is reached at or before the specified time. *When this element is **not** combined with another vertical clearance the altitude specified is the assigned level.*	W/U
27	CLIMB TO REACH [altitude] BY [position]	Instruction that a climb is to commence at a rate such that the specified level is reached at or before the specified position. *When this element is **not** combined with another vertical clearance the altitude specified is the assigned level.*	W/U
28	DESCEND TO REACH [altitude] BY [time]	Instruction that a descent is to commence at a rate such that the specified level is reached at or before the specified time. *When this element is **not** combined with another vertical clearance the altitude specified is the assigned level.*	W/U
29	DESCEND TO REACH [altitude] BY [position]	Instruction that a descent is to commence at a rate such that the specified level is reached at or before the specified position. *When this element is **not** combined with another vertical clearance the altitude specified is the assigned level.*	W/U
30	MAINTAIN BLOCK [altitude] TO [altitude]	A level within the specified vertical range is to be maintained.	W/U
31	CLIMB TO AND MAINTAIN BLOCK [altitude] TO [altitude]	Instruction that a climb to a level within the specified vertical range is to commence.	W/U
32	DESCEND TO AND MAINTAIN BLOCK [altitude] TO [altitude]	Instruction that a descent to a level within the specified vertical range is to commence.	W/U
33	CRUISE [altitude]	Instruction that authorizes a pilot to conduct flight at any altitude from the minimum altitude up to and including the altitude specified in the clearance. Further, it is approval for the pilot to proceed to and make an approach at the destination airport. *Due to different interpretations between the various ATS units, this element should be avoided.*	W/U
34	CRUISE CLIMB TO [altitude]	A cruise climb is to commence and continue until the specified level is reached. *Due to different interpretations between the various ATS units, this element should be avoided.*	W/U
35	CRUISE CLIMB ABOVE [altitude]	A cruise climb can commence once above the specified level. *Due to different interpretations between the various ATS units, this element should be avoided.*	W/U
36	EXPEDITE CLIMB TO [altitude]	The climb to the specified level should be made at the aircraft's best rate.	W/U

Uplink - Vertical Clearances, continued

UL #	Message Element	Message Intent	Response
37	EXPEDITE DESCENT TO [altitude]	The descent to the specified level should be made at the aircraft's best rate.	W/U
38	IMMEDIATELY CLIMB TO [altitude]	Urgent instruction to immediately climb to the specified level.	W/U
39	IMMEDIATELY DESCEND TO [altitude]	Urgent instruction to immediately descend to the specified level.	W/U
40	IMMEDIATELY STOP CLIMB AT [altitude]	Urgent instruction to immediately stop a climb once the specified level is reached.	W/U
41	IMMEDIATELY STOP DESCENT AT [altitude]	Urgent instruction to immediately stop a descent once the specified level is reached.	W/U
171	CLIMB AT [vertical rate] MINIMUM	Instruction to climb at not less than the specified rate.	W/U
172	CLIMB AT [vertical rate] MAXIMUM	Instruction to climb at not above the specified rate.	W/U
173	DESCEND AT [vertical rate] MINIMUM	Instruction to descend at not less than the specified rate.	W/U
174	DESCEND AT [vertical rate] MAXIMUM	Instruction to descend at not above the specified rate.	W/U

Uplink - Crossing Constraints

UL #	Message Element	Message Intent	Response
42	EXPECT TO CROSS [position] AT [altitude]	Notification that a level change instruction should be expected which will require the specified position to be crossed at the specified level.	R
43	EXPECT TO CROSS [position] AT [altitude] OR ABOVE	Notification that a level change instruction should be expected which will require the specified position to be crossed at or above the specified level.	R
44	EXPECT TO CROSS [position] AT [altitude] OR BELOW	Notification that a level change instruction should be expected which will require the specified position to be crossed at or below the specified level.	R
45	EXPECT TO CROSS [position] AT AND MAINTAIN [altitude]	Notification that a level change instruction should be expected which will require the specified position to be crossed at the specified level which is to be maintained subsequently.	R
46	CROSS [position] AT [altitude]	The specified position is to be crossed at the specified level. This may require the aircraft to modify its climb or descent profile.	W/U
47	CROSS [position] AT OR ABOVE [altitude]	The specified position is to be crossed at or above the specified level.	W/U
48	CROSS [position] AT OR BELOW [altitude]	The specified position is to be crossed at or below the specified level.	W/U
49	CROSS [position] AT AND MAINTAIN [altitude]	Instruction that the specified position is to be crossed at the specified level and that level is to be maintained when reached.	W/U
50	CROSS POSITION BETWEEN [altitude] AND [altitude]	The specified position is to be crossed at a level between the specified levels.	W/U
51	CROSS [position] AT [time]	The specified position is to be crossed at the specified time.	W/U
52	CROSS [position] AT OR BEFORE [time]	The specified position is to be crossed at or before the specified time.	W/U
53	CROSS [position] AT OR AFTER [time]	The specified position is to be crossed at or after the specified time.	W/U
54	CROSS [position] BETWEEN [time] AND [time]	The specified position is to be crossed at a time between the specified times.	W/U
55	CROSS [position] AT [speed]	The specified position is to be crossed at the specified speed and the specified speed is to be maintained until further advised.	W/U

Uplink - Crossing Constraints, continued

UL #	Message Element	Message Intent	Response
56	CROSS [position] AT OR LESS THAN [speed]	The specified position is to be crossed at a speed equal to or less than the specified speed and the specified speed or less is to be maintained until further advised.	W/U
57	CROSS [position] AT OR GREATER THAN [speed]	The specified position is to be crossed at a speed equal to or greater than the specified speed and the specified speed or greater is to be maintained until further advised.	W/U
58	CROSS [position] AT [time] AT [altitude]	The specified position is to be crossed at the specified time and the specified level.	W/U
59	CROSS [position] AT OR BEFORE [time] AT [altitude]	The specified position is to be crossed at or before the specified time and at the specified level.	W/U
60	CROSS [position] AT OR AFTER [time] AT [altitude]	The specified position is to be crossed at or after the specified time and at the specified level.	W/U
61	CROSS [position] AT AND MAINTAIN [altitude] AT [speed]	Instruction that the specified position is to be crossed at the specified level and speed and the level and speed are to be maintained.	W/U
62	AT [time] CROSS [position] AT AND MAINTAIN [altitude]	Instruction that at the specified time the specified position is to be crossed at the specified level and the level is to be maintained.	W/U
63	AT [time] CROSS [position] AT AND MAINTAIN [altitude] AT [speed]	Instruction that at the specified time the specified position is to be crossed at the specified level and speed and the level and speed are to be maintained.	W/U

Uplink - Lateral Offsets

UL #	Message Element	Message Intent	Response
64	OFFSET [direction] [distance offset] OF ROUTE	Instruction to fly a parallel track to the cleared route at a displacement of the specified distance in the specified direction.	W/U
65	AT [position] OFFSET [direction] [distance offset] OF ROUTE	Instruction to fly a parallel track to the cleared route at a displacement of the specified distance in the specified direction and commencing at the specified position.	W/U
66	AT [time] OFFSET [direction] [distance offset] OF ROUTE	Instruction to fly a parallel track to the cleared route at a displacement of the specified distance in the specified direction and commencing at the specified time.	W/U
67	PROCEED BACK ON ROUTE	The cleared flight route is to be rejoined.	W/U
68	REJOIN ROUTE BY [position]	The cleared flight route is to be rejoined at or before the specified position.	W/U
69	REJOIN ROUTE BY [time]	The cleared flight route is to be rejoined at or before the specified time.	W/U
70	EXPECT BACK ON ROUTE BY [position]	Notification that a clearance may be issued to enable the aircraft to rejoin the cleared route at or before the specified position.	R
71	EXPECT BACK ON ROUTE BY [time]	Notification that a clearance may be issued to enable the aircraft to rejoin the cleared route at or before the specified time.	R
72	RESUME OWN NAVIGATION	Instruction to resume own navigation following a period of tracking or heading clearances. May be used in conjunction with an instruction on how or where to rejoin the cleared route.	W/U

Uplink - Route Modifications

UL #	Message Element	Message Intent	Response
73	[predepartureclearance]	Message will not be used	W/U
74	PROCEED DIRECT TO [position]	Instruction to proceed directly from the present position to the specified position.	W/U
75	WHEN ABLE PROCEED DIRECT TO [position]	Instruction to proceed, when able, directly to the specified position.	W/U
76	AT [time] PROCEED DIRECT TO [position]	Instruction to proceed, at the specified time, to the specified position.	W/U
77	AT [position] PROCEED DIRECT TO [position]	Instruction to proceed, at the specified position, directly to the next specified position.	W/U
78	AT [altitude] PROCEED DIRECT TO [position]	Instruction to proceed, upon reaching the specified level, directly to the specified position.	W/U
79	CLEARED TO [position] VIA [route clearance]	Instruction to proceed to the specified position via the specified route.	W/U
80	CLEARED [route clearance]	Instruction to proceed via the specified route.	W/U
81	CLEARED [procedure name]	Instruction to proceed in accordance with the specified procedure.	W/U
82	CLEARED TO DEVIATE UP TO [direction] [distance offset] OF ROUTE	Approval to deviate up to the specified distance from the cleared route in the specified direction.	W/U
83	AT [position] CLEARED [route clearance]	Instruction to proceed from the specified position via the specified route.	W/U
84	AT [position] CLEARED [procedure name]	Instruction to proceed from the specified position via the specified procedure.	W/U
85	EXPECT [route clearance]	Notification that a clearance to fly on the specified route may by issued.	R
86	AT [position] EXPECT [route clearance]	Notification that a clearance to fly on the specified route from the specified position may by issued.	R
87	EXPECT DIRECT TO [position]	Notification that a clearance to fly directly to the specified position may by issued.	R
88	AT [position] EXPECT DIRECT TO [position]	Notification that a clearance to fly directly from the first specified to the next specified position may by issued.	R
89	AT [time] EXPECT DIRECT TO [position]	Notification that a clearance to fly directly to the specified position commencing at the specified time may by issued.	R
90	AT [altitude] EXPECT DIRECT TO [position]	Notification that a clearance to fly directly to the specified position commencing when the specified level is reached may by issued.	R
91	HOLD AT [position] MAINTAIN [altitude] INBOUND TRACK [degrees] [direction] TURN LEG TIME [leg type]	Instruction to enter a holding pattern with the specified characteristics at the specified position and level.	W/U
92	HOLD AT [position] AS PUBLISHED MAINTAIN [altitude]	Instruction to enter a holding pattern with the published characteristics at the specified position and level.	W/U
93	EXPECT FURTHER CLEARANCE AT [time]	Notification that an onwards clearance may be issued at the specified time.	R
94	TURN [direction] HEADING [degrees]	Instruction to turn left or right as specified onto the specified heading.	W/U
95	TURN [direction] GROUND TRACK [degrees]	Instruction to turn left or right as specified onto the specified track.	W/U
96	FLY PRESENT HEADING	Instruction to continue to fly on the current heading.	W/U
97	AT [position] FLY HEADING [degrees]	Instruction to fly on the specified heading from the specified position.	W/U

Uplink - Route Modifications, continued

UL #	Message Element	Message Intent	Response
98	IMMEDIATELY TURN [direction] HEADING [degrees]	Instruction to turn immediately left or right as specified onto the specified heading.	W/U
99	EXPECT [procedure name]	Notification that a clearance may be issued for the aircraft to fly the specified procedure.	R
178	TRACK DETAIL MESSAGE	***Message not defined.***	

Uplink - Speed Changes

UL #	Message Element	Message Intent	Response
100	AT [time] EXPECT [speed]	Notification that a speed instruction may be issued to be effective at the specified time.	R
101	AT [position] EXPECT [speed]	Notification that a speed instruction may be issued to be effective at the specified position.	R
102	AT [altitude] EXPECT [speed]	Notification that a speed instruction may be issued to be effective at the specified level.	R
103	AT [time] EXPECT [speed] TO [speed]	Notification that a speed range instruction may be issued to be effective at the specified time.	R
104	AT [position] EXPECT [speed] TO [speed]	Notification that a speed range instruction may be issued to be effective at the specified position.	R
105	AT [altitude] EXPECT [speed] TO [speed]	Notification that a speed range instruction may be issued to be effective at the specified level.	R
106	MAINTAIN [speed]	The specified speed is to be maintained.	W/U
107	MAINTAIN PRESENT SPEED	The present speed is to be maintained.	W/U
108	MAINTAIN [speed] OR GREATER	The specified speed or a greater speed is to be maintained.	W/U
109	MAINTAIN [speed] OR LESS	The specified speed or a lesser speed is to be maintained.	W/U
110	MAINTAIN [speed] TO [speed]	A speed within the specified range is to be maintained.	W/U
111	INCREASE SPEED TO [speed]	The present speed is to be increased to the specified speed and maintained until further advised.	W/U
112	INCREASE [speed] TO [speed] OR GREATER	The present speed is to be increased to the specified speed or greater and maintained at or above the specified speed until further advised.	W/U
113	REDUCE SPEED TO [speed]	The present speed is to be reduced to the specified speed and maintained until further advised.	W/U
114	REDUCE SPEED TO [speed] OR LESS	The present speed is to be reduced to the specified speed or less and maintained at or below the specified speed until further advised.	W/U
115	DO NOT EXCEED [speed]	The specified speed is not to be exceeded.	W/U
116	RESUME NORMAL SPEED	Notification that the aircraft ;need no longer comply with the previously issued speed restriction.	W/U

Uplink - Contact/Monitor/Surveillance Requests

UL #	Message Element	Message Intent	Response
117	CONTACT [icaounitname] [frequency]	The pilot is required to call the ATS facility on the specified frequency.	W/U
118	AT [position] CONTACT [icaounitname] [frequency]	At the specified position the ATS unit with the specified ATS unit name is to be contacted on the specified frequency.	W/U
119	AT [time] CONTACT [icaounitname] [frequency]	At the specified time the ATS unit with the specified ATS unit name is to be contacted on the specified frequency.	W/U
120	MONITOR [icaounitname] [frequency]	The pilot is required to monitor the ATS facility on the specified frequency. *The pilot is not required to check in.*	W/U
121	AT [position] MONITOR [icaounitname] [frequency]	At the specified position the ATS unit with the specified ATS unit name is to be monitored on the specified frequency.	W/U
122	AT [time] MONITOR [icaounitname] [frequency]	At the specified time the ATS unit with the specified ATS unit name is to be monitored on the specified frequency.	W/U
123	SQUAWK [beacon code]	The specified code (SSR code) is to be selected.	W/U
124	STOP SQUAWK	The SSR transponder responses are to be disabled.	W/U
125	SQUAWK ALTITUDE	The SSR transponder responses should include level information.	W/U
126	STOP ALTITUDE SQUAWK	The SSR transponder responses should no longer include level information.	W/U
179	SQUAWK IDENT	The “ident” function on the SSR transponder is to be actuated.	W/U

Uplink - Report/Confirmation Requests

UL #	Message Element	Message Intent	Response
127	REPORT BACK ON ROUTE	Instruction to report when the aircraft is back on the cleared route.	R
128	REPORT LEAVING [altitude]	Instruction to report when the aircraft has left the specified level. *Either a level that has been maintained, or a level passed through on climb or descent.*	R
129	REPORT LEVEL [altitude]	Instruction to report when the aircraft is in level flight at the specified level.	R
175	REPORT REACHING [altitude]	Instruction to report when the aircraft has reached the specified level. *This element is not be used to determine when an aircraft is in level flight at the specified level. See 5.7.2.*	R
180	REPORT REACHING BLOCK [altitude] TO [altitude]	Instruction to report when the aircraft is within the specified vertical range.	R
130	REPORT PASSING [position]	Instruction to report when the aircraft has passed the specified position.	R
181	REPORT DISTANCE [to/from] [position]	Instruction to report the present distance to or from the specified position.	NE
131	REPORT REMAINING FUEL AND SOULS ON BOARD	Instruction to report the amount of fuel remaining and the number of persons on board.	NE
132	CONFIRM POSITION	Instruction to report the present position.	NE
133	CONFIRM ALTITUDE	Instruction to report the present level.	NE
134	CONFIRM SPEED	Instruction to report the present speed.	NE
135	CONFIRM ASSIGNED ALTITUDE	Instruction to confirm and acknowledge the currently assigned level.	NE

Uplink - Report/Confirmation Requests, continued

UL #	Message Element	Message Intent	Response
136	CONFIRM ASSIGNED SPEED	Instruction to confirm and acknowledge the currently assigned speed.	NE
137	CONFIRM ASSIGNED ROUTE	Instruction to confirm and acknowledge the currently assigned route.	NE
138	CONFIRM TIME OVER REPORTED WAYPOINT	Instruction to confirm the previously reported time over the last reported waypoint.	NE
139	CONFIRM REPORTED WAYPOINT	Instruction to confirm the identity of the previously reported waypoint.	NE
140	CONFIRM NEXT WAYPOINT	Instruction to confirm the identity of the next waypoint.	NE
141	CONFIRM NEXT WAYPOINT ETA	Instruction to confirm the previously reported estimated time at the next waypoint.	NE
142	CONFIRM ENSUING WAYPOINT	Instruction to confirm the identity of the next plus one waypoint.	NE
143	CONFIRM REQUEST	The request was not understood. It should be clarified and resubmitted.	NE
144	CONFIRM SQUAWK	Instruction to report the currently selected transponder code.	NE
145	CONFIRM HEADING	Instruction to report the present heading.	NE
146	CONFIRM GROUND TRACK	Instruction to report the present ground track.	NE
182	CONFIRM ATIS CODE	Instruction to report the identification code of the last ATIS received.	NE
147	REQUEST POSITION REPORT	Instruction to make a position report. *To be used if the controller does not receive a scheduled position report.*	NE

Uplink - Negotiation Requests

UL #	Message Element	Message Intent	Response
148	WHEN CAN YOU ACCEPT [altitude]	Request for the earliest time at which the specified level can be accepted.	NE
149	CAN YOU ACCEPT [altitude] AT [position]	Instruction to report whether or not the specified level can be accepted at the specified position.	A/N
150	CAN YOU ACCEPT [altitude] AT [time]	Instruction to report whether or not the specified level can be accepted at the specified time.	A/N
151	WHEN CAN YOU ACCEPT [speed]	Request for the earliest time at which the specified speed can be accepted.	NE
152	WHEN CAN YOU ACCEPT [direction] [distance] OFFSET	Request for the earliest time at which the specified offset track can be accepted.	NE

Uplink - Air Traffic Advisories

UL #	Message Element	Message Intent	Response
153	ALTIMETER [altimeter]	ATS advisory that the altimeter setting should be the specified setting.	R
154	RADAR SERVICES TERMINATED	ATS advisory that the radar service is terminated.	R
155	RADAR CONTACT [position]	ATS advisory that radar contact has been established at the specified position.	R
156	RADAR CONTACT LOST	ATS advisory that radar contact has been lost.	R
157	CHECK STUCK MICROPHONE [frequency]	A continuous transmission is detected on the specified frequency. Check the microphone button.	R
158	ATIS [atis code]	ATS advisory that the ATIS information identified by the specified code is the current ATIS information.	R

Uplink - System Management Messages

UL #	Message Element	Message Intent	Response
159	ERROR [error information]	A system generated message that the ground system has detected an error.	NE
160	NEXT DATA AUTHORITY [facility designation]	Notification to the avionics that the next data authority is the specified ATSU.	NE
161	END SERVICE	Notification to the avionics that the data link connection with the current data authority is being terminated.	NE
162	SERVICE UNAVAILABLE	Notification that the ground system does not support this message.	NE
163	[icao facility designation] [tp4Table]	Notification to the pilot of an ATSU identifier.	NE

Uplink - Additional Messages

UL #	Message Element	Message Intent	Response
164	WHEN READY	The associated instruction may be complied with at any future time.	NE
165	THEN	Used to link two messages, indicating the proper order of execution of clearances/instructions.	NE
166	DUE TO TRAFFIC	The associated instruction is issued due to traffic considerations.	NE
167	DUE TO AIRSPACE RESTRICTION	The associated instruction is issued due to airspace restrictions.	NE
168	DISREGARD	The indicated communication should be ignored. *The previously sent uplink CPDLC message shall be ignored. DISREGARD should not refer to a clearance or instruction. If DISREGARD is used, another element shall be added to clarify which message is to be disregarded.*	R
176	MAINTAIN OWN SEPARATION AND VMC	Notification that the pilot is responsible for maintaining separation from other traffic and is also responsible for maintaining Visual Meteorological Conditions.	W/U
177	AT PILOTS DISCRETION	Used in conjunction with a clearance or instruction to indicate that the pilot may execute when prepared to do so.	N
169	[freetext]	*Normal urgency attribute.*	R
170	[freetext]	*Distress urgency attribute.*	R

Downlink Message Elements

Downlink - Responses

DL #	Message Element	Message Intent	Response
0	WILCO	The instruction is understood and will be complied with.	N
1	UNABLE	Wait for a reply. *The controller is informed that the request is being assessed and there will be a short-term delay (within 10 minutes. The exchange is not closed and the request will be responded to when conditions allow.*	N
2	STANDBY	Message received and understood.	N
3	ROGER	*ROGER is the only correct response to an uplink freetext message. Under no circumstances will ROGER be used instead of AFFIRM.*	N
4	AFFIRM	Yes. *AFFIRM is an appropriate response to an uplinked negotiation request.*	N
5	NEGATIVE	No. *NEGATIVE is an appropriate response to an uplinked negotiation request.*	N

Downlink - Vertical Requests

DL #	Message Element	Message Intent	Response
6	REQUEST [altitude]	Request to fly at the specified level.	Y
7	REQUEST BLOCK [altitude] TO [altitude]	Request to fly at a level within the specified vertical range.	Y
8	REQUEST CRUISE CLIMB TO [altitude]	Request to cruise climb to the specified level. *Due to different interpretations between the various ATS units, this element should be avoided.*	Y
9	REQUEST CLIMB TO [altitude]	Request to climb to the specified level.	Y
10	REQUEST DESCENT TO [altitude]	Request to descend to the specified level.	Y
11	AT [position] REQUEST CLIMB TO [altitude]	Request that at the specified position a climb to the specified level be approved.	Y
12	AT [position] REQUEST DESCENT TO [altitude]	Request that at the specified position a descent to the specified level be approved.	Y
13	AT [time] REQUEST CLIMB TO [altitude]	Request that at the specified time a climb to the specified level be approved.	Y
14	AT [time] REQUEST DESCENT TO [altitude]	Request that at the specified time a descent to the specified level be approved.	Y

Downlink - Lateral Offset Requests

DL #	Message Element	Message Intent	Response
15	REQUEST OFFSET [direction] [distance] OF ROUTE	Request that a parallel track, offset from the cleared track by the specified distance in the specified direction, be approved.	Y
16	AT [position] REQUEST OFFSET [direction] [distance] OF ROUTE	Request that a parallel track, offset from the cleared track by the specified distance in the specified direction, be approved from the specified position.	Y
17	AT [time] REQUEST OFFSET [direction] [distance] OF ROUTE	Request that a parallel track, offset from the cleared track by the specified distance in the specified direction, be approved from the specified time.	Y

Downlink - Speed Requests

DL #	Message Element	Message Intent	Response
18	REQUEST [speed]	Request to fly at the specified speed.	Y
19	REQUEST [speed] TO [speed]	Request to fly within the specified speed range.	Y

Downlink - Voice Contact Requests

DL #	Message Element	Message Intent	Response
20	REQUEST VOICE CONTACT	Request for voice contact.	Y
21	REQUEST VOICE CONTACT [frequency]	Request for voice contact on the specified frequency.	Y

Downlink - Route Modification Requests

DL #	Message Element	Message Intent	Response
22	REQUEST DIRECT TO [position]	Request to track from the present position direct to the specified position.	Y
23	REQUEST [procedure name]	Request for the specified procedure clearance.	Y
24	REQUEST [route clearance]	Request for a route clearance.	Y
25	REQUEST CLEARANCE	Request for either a pre-departure or route clearance.	Y
26	REQUEST WEATHER DEVIATION TO [position] VIA [route clearance]	Request for a weather deviation to the specified position via the specified route.	Y
27	REQUEST WEATHER DEVIATION UP TO [direction] [distance offset] OF ROUTE	Request for a weather deviation up to the specified distance off track in the specified direction.	Y
70	REQUEST HEADING [degrees]	Request a clearance to adopt the specified heading.	Y
71	REQUEST GROUND TRACK [degrees]	Request a clearance to adopt the specified ground track.	Y

Downlink - Reports

DL #	Message Element	Message Intent	Response
28	LEAVING [altitude]	Notification of leaving the specified level.	N
29	CLIMBING TO [altitude]	Notification of climbing to the specified level.	N
30	DESCENDING TO [altitude]	Notification of descending to the specified level.	N
31	PASSING [position]	Notification of passing the specified position.	N
78	AT [time] [distance] [to/from] [position]	At the specified time, the aircraft's position was as specified.	N
32	PRESENT ALTITUDE [altitude]	Notification of the present level.	N
33	PRESENT POSTION [position]	Notification of the present position.	N
34	PRESENT SPEED [speed]	Notification of the present speed.	N
35	PRESENT HEADING [degrees]	Notification of the present heading in degrees.	N
36	PRESENT GROUND TRACK [degrees]	Notification of the present ground track in degrees.	N
37	LEVEL [altitude]	Notification that the aircraft is maintaining the specified level.	N
72	REACHING [altitude]	Notification that the aircraft has reached the specified level.	N
76	REACHING BLOCK [altitude] TO [altitude]	Notification that the aircraft has reached a level within the specified vertical range.	N
38	ASSIGNED ALTITUDE [altitude]	Read-back of the assigned level.	N
77	ASSIGNED BLOCK [altitude] TO [altitude]	Read-back of the assigned vertical range.	N
39	ASSIGNED SPEED [speed]	Read-back of the assigned speed.	N
40	ASSIGNED ROUTE [route clearance]	Read-back of the assigned route.	N
41	BACK ON ROUTE	The aircraft has regained the cleared route.	N
42	NEXT WAYPOINT [position]	The next waypoint is the specified position.	N
43	NEXT WAYPOINT ETA [time]	The ETA at the next waypoint is as specified.	N
44	ENSUING WAYPOINT [position]	The next plus one waypoint is the specified position.	N
45	REPORTED WAYPOINT [position]	Clarification of previously reported waypoint passage.	N

Downlink - Reports, continued

DL #	Message Element	Message Intent	Response
46	REPORTED WAYPOINT [time]	Clarification of time over previously reported waypoint.	N
47	SQUAWKING [beacon code]	The specified (SSR) code has been selected.	N
48	POSITION REPORT [position report]	Reports the current position of the aircraft when the pilot presses the button to send this message. *ATC expects position reports based on this downlink message.*	N
79	ATIS [atis code]	The code of the latest ATIS received is as specified.	N
80	DEVIATING [direction] [distance offset] OF ROUTE	Notification that the aircraft is deviating from the cleared route by the specified distance in the specified direction.	N

Downlink - Negotiation Requests

DL #	Message Element	Message Intent	Response
49	WHEN CAN WE EXPECT [speed]	Request for the earliest time at which a clearance to the specified speed can be expected.	Y
50	WHEN CAN WE EXPECT [speed] TO [speed]	Request for the earliest time at which a clearance to a speed within the specified range can be expected.	Y
51	WHEN CAN WE EXPECT BACK ON ROUTE	Request for the earliest time at which a clearance to regain the planned route can be expected.	Y
52	WHEN CAN WE EXPECT LOWER ALTITUDE	Request for the earliest time at which a clearance to descend can be expected.	Y
53	WHEN CAN WE EXPECT HIGHER ALTITUDE	Request for the earliest time at which a clearance to climb can be expected.	Y
54	WHEN CAN WE EXPECT CRUISE CLIMB TO [altitude]	Request for the earliest time at which a clearance to cruise climb to the specified level can be expected.	Y

Downlink - Emergency Messages

See Appendix B

Downlink - System Management Messages

DL #	Message Element	Message Intent	Response
62	ERROR [error information]	A system generated message that the avionics has detected an error.	N
63	NOT CURRENT DATA AUTHORITY	A system generated denial to any CPDLC message sent from a ground facility that is not the Current Data Authority.	N
64	[icao facility designation]	Notification to the ground system that the specified ATSU is the current data authority.	N
73	[version number]	A system generated message indicating the software version number.	N

Downlink - Additional Messages

DL #	Message Element	Message Intent	Response
65	DUE TO WEATHER	Used to explain reasons for aircraft operator's message.	N
66	DUE TO AIRCRAFT PERFORMANCE	Used to explain reasons for aircraft operator's message.	N
74	MAINTAIN OWN SEPARATION AND VMC	States a desire by the pilot to provide his/her own separation and remain in VMC.	N
75	AT PILOTS DISCRETION	Used in conjunction with another message to indicate that the pilot wishes to execute the request when the pilot is prepared to do so.	N

Downlink - Additional Messages, continued

DL #	Message Element	Message Intent	Response
67	[freetext]	*Normal urgency attribute.*	N
67b	WE CAN ACCEPT [altitude] AT [time]	We can accept the specified level at the specified time.	N
67c	WE CAN ACCEPT [speed] AT [time]	We can accept the specified speed at the specified time.	N
67d	WE CAN ACCEPT [direction] [distance offset] AT [time]	We can accept the specified parallel track offset the specified distance in the specified direction at the specified time.	N
67e	WE CANNOT ACCEPT [altitude]	We cannot accept the specified level.	N
67f	WE CANNOT ACCEPT [speed]	We cannot accept the specified speed.	N
67g	WE CANNOT ACCEPT [direction] [distance offset]	We cannot accept the specified parallel track offset the specified distance in the specified direction.	N
67h	WHEN CAN WE EXPECT CLIMB TO [altitude]	Request for the earliest time at which a clearance to climb to the specified level can be expected.	N
67i	WHEN CAN WE EXPECT DESCENT TO [altitude]	Request for the earliest time at which a clearance to descend to the specified level can be expected.	N
68	[freetext]	*Distress urgency attribute.*	Y

Appendix H - Reference Guide to NAT Data Link Services

In this table “ADS GM” means “Guidance Material for ATS Data Link Services in NAT Airspace”.

OCA/FIR (AFN Logon)	ADS	CPDLC	Remarks
Reykjavik (BIRD)	Yes	No	Flights in the Reykjavik FIR should not have an Active Center unless they have completed AFN Logon to a subsequent FIR in accordance with 7.3.5 or the previous ATSU is maintaining their CPDLC connection in accordance with 7.3.8. Initial voice contact with Aeradio - in accordance with section 4.5, ADS GM.
Santa Maria (LPPO)	Yes	No	Flights in the Santa Maria FIR should not have an Active Center unless they have completed AFN Logon to a subsequent FIR in accordance with 7.3.5 or the previous ATSU is maintaining their CPDLC connection in accordance with 7.3.8. Initial voice contact with Aeradio - in accordance with section 4.5, ADS GM.
Shanwick (EGGX)	Yes	Yes	CPDLC messages will be accepted only if they consist of elements from Appendix A appropriate for the current Phase, or from Appendix B. AFN Logon will be rejected unless the oceanic clearance has been issued. Westbound flights proceeding into or transiting the Madrid FIR will not receive CPDLC services in the Shanwick FIR. Initial voice contact with Aeradio - in accordance with 7.4.
Gander (CZQX)	Yes	Yes	CPDLC messages should only consist of elements from Appendix A appropriate for the current Phase or from Appendix B. Initial voice contact with Aeradio - in accordance with 7.4.
New York (KZWY)	Yes	Yes - In New York Data Link service area (see 2.6.1)	Flights may need to manually complete AFN Logon to KZWY to receive CPDLC services. Flights will not need to complete additional AFN Logon to enable ADS contracts with other NAT OCAs that offer ADS services. Initial voice contact with Aeradio - in accordance with 7.4.